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AN EXPEDITION TO BORGU, ON THE NIGER.*

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I FIND myself in an embarrassing position to-night, for, while conscious of the great honour conferred upon me by the invitation of your Council to read a paper on my recent mission in West Africa, I feel that the geographical results of that short journey in no way merit such a recognition.

It must often have caused you wonder that many travellers who have wandered far from the beaten tracks, should return with so meagre a stock of information about the countries they have traversed, and can tell you so little that is new and interesting, even though each day unfolded before them scenes upon which no European eye had ever dwelt, and their daily work lay among peoples whose customs and manners had as yet been screened from the fierce search-light of the Royal Geographical Society.

But you must bear in mind that the leader of an expedition in Africa is a much-harassed person, whose energies on the line of march are divided between observing nature through the medium of a prismatic compass, pulling sedentary donkeys out of inappropriate ditches, timing distance by watch and foot-pace, discussing the probabilities of a feasible camping-ground (where food and water may be obtainable) with a guide whose ideas of time and space are absolutely vague, and finally, perhaps, ever on the alert for signs of the presence of an enemy in the bush. Under these circumstances a man cannot photograph on the retina of his memory the aspect of a country, with its hills and valleys and distant ranges.

In camp it is still harder. Arrangements for food, palavers and

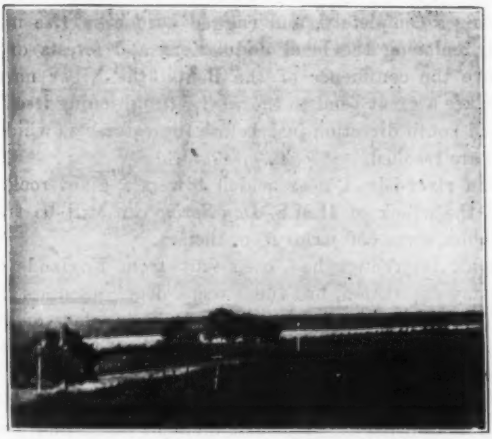
* Paper read at the Royal Geographical Society, July 1, 1895. Map, p. 300.

interchange of presents with the local chiefs, the usual routine of camp discipline, preparations perhaps for defence, diary-writing, map-making, astronomical observations, and a thousand other matters, demand his time and attention, and night has already closed before he has found opportunity for any discussion with natives on those points of general scientific and geographical interest, some knowledge of which are the necessary credentials for appearing on the platform on which I stand. The leader of an ordinary expedition is not a man of the leisured class, but the leader of an expedition in a hurry feels as though he had less opportunity for surveying nature as a whole than the guard of a district-railway train. I shall not, however, have read my paper—such as it is—in vain to-night, if I may have succeeded in explaining to you the reasons why travellers—at any rate, those whose object has not been simply and solely geographical—sometimes appear to have neglected golden opportunities, and have returned with information comparatively meagre and unsatisfactory of the districts which they have passed through.

Sailing from Liverpool, West Coast steamers touch at the Canaries, Sierra Leone, Accra (the Government head-quarters of the Gold Coast), Lagos, and probably at several ports in the Niger Coast Protectorate (Benin, Wari, etc.), before they reach Akassa, the Royal Niger Company's depôt at the Nun mouth of the Niger. Thence transferring to one of the Company's river steamers, one proceeds up the Niger. In the year 1895 there cannot be much which is new to say of the ascent of the Niger; as well almost might I describe to you the journey from Cairo to Assuan. But since, in all probability, few in this room *have* ascended the Niger, I will venture a few brief words of description.

Of the great rivers I have seen — the Irawady, the Ganges, the Zambesi, the Indus, and others—none has ever so excited my imagination by its size and the vast volume of water which it bears to the ocean as the Niger. For over 100 miles the knowledge that the mighty river up which we are travelling is but one of a score of the mouths of the Niger, which form its delta, is ever present to one's mind. These various outlets of the river extend along some 250 miles of coast-line, and form great ocean creeks; while the breadth of the larger channels varies from half a mile or less to over a mile in breadth. Not till we arrive at Abo (some 100 miles, as I have said, from the sea), do we reach the single channel from which this network of streams divide. Here, therefore, the river widens out, and presents the appearance of a comparatively narrow but illimitable lake. Long before this point is reached, the fantastic mangrove thickets have given place to dense masses of exquisite woodland forest; it is like emerging from a dark and sombre funeral procession into the light and colour of day! For those who are unfamiliar with its eccentricities, the mangrove merits a passing word of description. Over the impenetrable primeval swamps

or lowlying lands submerged by the rising tide or the winter floods, the dark silent mangrove forest keeps watch. Nor foot of man nor foot of beast has trodden large areas of these pathless thickets—save, perhaps, some stray homeless elephant—since the days of an elder creation. One's imagination can fancy the giant lizards and extinct amphibians without incongruity in such desolate wilds. But to-day all nature is still; neither bird nor monkey disturbs the silence, unless it be some long-legged wader or solemn crane. The mangrove trees themselves seem to have lost count of the vegetable proprieties, and stand as it were on stilts with their branches tucked up out of the wet, and leave their gaunt roots exposed in mid-air. Branches (or shall I call them roots?) leave the parent trunk 10 or 12 feet above ground, and strike



MOUTH OF NIGER FROM AKASSA STATION.
(*From a photograph by Dr. W. H. Crosse.*)

downwards into the sluggish water to form a prop which is neither root nor branch. Here we may see a tree beginning its individuality on a tripod of such branch-roots 10 feet above the ground, while its neighbours are linked by boughs which grow out of one tree-trunk into another, and form a Siamese link, as though there were a sense of humour in the vegetable world, and these weird trees had spent their endless leisure in forming themselves into living conundrums. On their water-washed roots shell-fish are fastened, so that the Irishman's paradox of oysters growing on trees has here a literal fulfilment.

To such a medley of unsightly tree-forms the contrast of the bank of forest which borders the river-side when the mangrove swamps are past, is a welcome and a pleasing contrast. This fringe of forest is exquisite both in colouring and in form. In colouring, because mingled with every tint of green are masses of scarlet and yellow and

purple blossom; in form, because interlaced with the giant mahogany and cotton trees are the waving fern-like fronds of the oil palm and still more beautiful raphia. The earlier reaches of the Niger are therefore a panorama of beautiful colour, through which the mile-broad river flows. As a rule the navigation presents few difficulties, except in the season of drought, when the varying sand-deposits choke the course of the stream at certain well-known points. At lowest water, however, when the current has selected the channels in which it will flow, the sand is to some extent washed out of these, and renders them comparatively easy once more. Giant trees borne down in the floods and partly buried in the sandbanks form dangerous snags, which have cost the Niger Company more than one valuable steamer. As we near Lokoja at the junction of the great river Benue, the character of the country changes completely, and rugged bare hills rise up in every perspective, replacing the level undulations and forests of the lower river. Above the confluence of the Benue the Niger narrows somewhat, and takes a great bend to the west, straightening itself again into its north and south direction just before the cataracts (which break the navigation) are reached.

Here on a river-island, near which towers a giant rock from midstream, and the wreck of H.M.S. *Day Spring* can still be traced, is the station of Jebba, some 550 miles from the sea.

Telegraphic instruction had been sent from England to purchase donkeys for my expedition, but there was a dearth of asses in the land, owing to local feuds in the Hausa country, and in place of 200 I found a bare 50, which were further reduced to 34. The balance had very sensibly preferred to die rather than face an expedition in the rains. Those that were left discovered their error very quickly, and proceeded to die off as fast as they could. This arrangement suited their convenience, but did not suit mine, for as each ass took the fatal decision and departed for a better world, he left behind him two loads, transport for which it devolved upon me to provide as best I could. This difficulty was overcome by engaging men, and even women, to carry loads from village to village. One stalwart lady selected a great awkward square bale weighing some 80 lbs., which had been evaded by the regular porters, and marched off with it at the head of the caravan. Next day she appeared before my tent in grief. I expected a story of wrongs endured, and gave her my whole attention. Never before had I employed a female porter, but necessity knew no law, and now I was ready to vindicate her rights. It transpired that her grievance was, that some unknown villain had taken her load, and left her with but an insignificant little bale to carry. Nor was she easily pacified. From this you may judge that if civility to the fair sex be a trait of African character, it is often due to the strength of circumstances, and of the lady's right arm.

To return to our asses. Finding that the bales of goods I had brought from England (cloth for food-purchase and payments of all sorts; valuable velvets, plushes, damasks, and embroidery as gifts to chiefs, etc.) required some adjustment, and that a large body of men must be enlisted to replace the donkeys, I decided to make a hurried trip to Bussa, the Borgu chief who owns the districts bordering the Niger, whose town is 100 miles up river beyond the cataracts. The king is a gentleman of much local importance. His theory seemed to be that there were many white men, but only one Bussa. My theory coincided with his when I knew him better. I was grateful to Providence that there was only one Bussa. I began to have misgivings that if all West African chiefs were constructed on the lines of this my first acquaintance, the day would come when my patience would pay out. What would

THE NIGER FROM ASABA.
(*From a photograph by Dr. W. H. Crosse.*)

happen in that case would probably be of great interest to me at the moment, and to my executors afterwards.

We lived in a Borgu hut, one of a little coterie of huts inhabited by peasant folk in common with their goats and fowls and babies. The younger women (who wore little or no clothes at all) pounded the grain and prepared the food. Our host was a weaver and made cloth, but he did not go in for an eight-hour day. I had pitched a tent, but the king of all the Bussas sent down a royal messenger to tell me that the particular spot by the river-side on which I was encamped was the one spot he desired, on which to go through some pagan ceremonies, so I had to clear out. The ceremonies were gone through. Their distinctive feature was a great deal of prancing about on diminutive ponies almost smothered with trappings, and a great deal of trumpet-blowing. These

trumpets were an institution new to me, and I saw, or rather *heard*, more of them subsequently in Borgu than I cared for. On each state occasion the king is accompanied by two men, who carry these instruments of torture. They are some 6 feet long, shaped like a gigantic four-in-hand bugle. At odd minutes during the "palaver" (as West African state discussions with black potentates are called), the two ushers of the bugle place the end which isn't in their mouths as near to the king's ear as possible and give vent to an appalling instrumental yell. The noise is absolutely deafening even at a distance; to have it done into one's ear must make one feel like a lost soul in Hades. But the king never moves a muscle of his face. I suppose it is West African etiquette, but it must be hard to acquire. We waited five or six days before His very dirty Majesty consented to hear our business, which he did in a hovel in the company of a couple of goats. I explained that it was my intention to go into Borgu, and that I had come to ask him for letters to the king of Nikki, and for guides and an envoy, who should explain who I was, and should inform Nikki that for many years the king of Bussa had been the friend of the Royal Niger Company, and had never had any misunderstanding with them. This matter of *letters* is a very important one in West Africa. The letters are written in Arabic or Hausa (in the Arabic character), and are veritable passports. Without such credentials one is looked on with suspicion, whereas if one brings a recommendation of this sort, each chief writes a fresh one to his neighbour whom you propose to visit next. Here is the first part of one as a sample:

This letter comes from Abdul Salami, Emir of Illorin, son of the late Suberu, Emir of Illorin, who was called Mallam, and whom they called Allimi, with salutations, etc., to Captain Lugard.

You are our friend, our friend in this affair. You are not among the warriors; you a traveller in many towns of different people. Look now, he is a traveller on account of buying and selling and of all trades. You should hear this. He spoke well to us; he says there is no plundering, no mischievous doings between you and I, but peace and friendship in all ways. This is what the people of the world are hearing; they came to me with friendship. This friendship, love, and respect, etc., should exist between you and I. You people of Borogun (Borgu) like the King of Kishi. If he come to you, dismiss him with friendship; even so you should bring him in the hand of the King of Kaioma (Kiama), with my many compliments to the King of Kaioma, so that the agreement between you and I may exist, and dismiss him with friendship till he comes to the King of Nikki and give my compliments to him. And the King of Nikki should dismiss him with friendship till he comes to Kwampanisa and give my compliments to him.

You should leave this white man alone. It is trade he requires of you; he is not of the wicked people, but peace.

Most of these letters begin by giving praise to God and to His Prophet Mahomet for "the gift of the pen by which we can make known our salutations and our wishes to our friends at a distance."

Here is a second letter referring to the negotiations regarding the Illorin-Lagos frontier:—

The Emir of Illorin, to Captain Lugard.

This letter comes from the servant of God; a letter to his friend Captain Lugard. I salute you, and am very glad of your arrival. How have you fared on the way? I am exceedingly glad of your arrival, and to hear that you have come in peace. Since you left I have been constantly praying that I may see you. After this I sat in my house, and God brought the time when we got peace with Ibadan. . . .

After detailing the points in dispute, he concludes somewhat quaintly in these words:—

I send you salutations. After these I send you a gift of a horse by my messenger. Ride on this horse and settle the trouble.

Bussa declined to give me any letter, saying that his envoy would say all that was required. He gave me a guide—in return for an out-

MANGROVE SWAMP.
(*From a photograph by Dr. W. H. Crosse.*)

rageously large present—and said that the envoy should precede me by a shorter route, while I returned to Jebba. I never heard anything further about him; and even the guide would go no further than my first stopping-place in Borgu. I have reason to believe that Bussa was anxious I should never return. No white man had ever yet returned from the interior of Borgu. Wolf and Duncan had penetrated some distance, and never came back; Kling had been forced to turn back; and Mons. Hess was killed by a poisoned arrow before he had even crossed the frontier. So Bussa was naturally hopeful; but, in order to make sure, he was careful to give me no credentials, and later on, when a combination of marauders attacked us, we saw on the spot a

man who had attracted our notice in Bussa's town. We parted from Bussa with no regrets. Mr. Watts, the very able and energetic administrator of the northern portion of the Company's territories, had accompanied me, and had been ill with violent fever most of the time. A Borgu hut in the rains is not the place or the time I would select to have my fever for choice, but, unfortunately, West African fever is by no means a matter of choice.

We came down the cataracts by canoe, and had a mild form of excitement in shooting some of the rapids, where the water boiled and eddied over some sunken rock and formed a very maelstrom, where to swim would be impossible.

Arrived at Jebba, I found that almost all the necessary men had been enlisted, and the other preparations I had initiated were complete. Not wishing to lose a single day, I started without any further delay. My expedition consisted of Messrs. Mottram and Reynolds, a couple of interpreters, 40 Hausa soldiers belonging to the Company's constabulary (who, unfortunately, were for the most part recruits), some 300 porters, and 34 donkeys and 5 ponies. What with attendants on the animals, our tent servants, and other odd men, the total of natives was over 360.

The donkeys gave us endless trouble. They broke down every few yards; they sat in every small rivulet; they tried to drown in every stream, and had to be hauled out by the ears and tail by main force, and when they had no other way of obstructing us, they died. What was a dry and parched and waterless district on my return journey, was now a series of streams running down from a low range of hills on our right, while the deeper clefts, also dry later in the year, were now rushing torrents, which delayed the donkeys for hours. On poor Mr. Mottram and Mr. Reynolds devolved the main task of superintending the donkeys —and it was a hard one indeed. It was necessary for me myself to arrive first, so as to select camp, see the local chiefs, arrange about food, and a score of other matters.

We started always as soon after daylight as possible, and while we had the donkeys with us, I don't think we ever did a full day's march much before sunset. On one occasion, indeed, I remember returning to relieve the others when my urgent camp-work was done, and bringing in the last of the caravan a little before midnight. The African donkey, either in East or in West Africa, cannot travel in the rains. Wet has the same effect upon him as it has on brown paper—it wholly unfits him to fulfil the objects for which he was made. But it was necessary to push on, for a French expedition was bound for the same destination as ourselves, and whoever arrived first would succeed, and the other would not. Indeed, on my return, I found that there had been some four different French expeditions and one German one; and the French papers spoke of it as "a veritable steeple-chase." But, then, the French have such imaginations! Had the editor changed places for a day

with Mr. Mottram and the donkeys, he would have modified his metaphors.

We took a circuitous course, making a *détour* to the south, for there was no way of cutting across country when the grass stood in a solid 6-foot wall backed by a range of mountains. It was tantalizing beyond measure to find one's self going due south when one wished to go due north; but the delay enabled me to get a most excellent letter of introduction from the Emin of Illorin (to whom I had sent civil messages), and to get my men to some extent in hand before we entered the dangerous country of Borgu.

So far not much time had been lost. We had arrived at Akassa from Liverpool late on August 28; by September 9 we were at Jebba, 550 miles up-river; and on the 27th we marched, with the 200-mile trip to Bussa accomplished, and all the many final details of the expedition

RETURNING FROM MARKET.
(*From a photograph by Dr. W. H. Crosse.*)

finished. Passing through a long stretch of sparse and uninhabited jungle, through which none dare travel for fear of the Borgu raiders, we reached Kishi, on the northern frontier of Yoruba-land. Here a treaty was made with the local chief, and we experienced the very greatest civility from these industrious and delightful people, who, however, live in daily dread of their lives from the incursions of the Borgu who raid all round their town.

The country of Borgu is, roughly speaking, included between the twelfth and ninth parallels of latitude, and the first and fourth meridians of east longitude, comprising approximately an area of 40,000 square miles, viz. more than half the area of England and Wales. Its importance politically lies in the fact that it is the Hinterland of the British colony and Protectorate of Lagos (*i.e.* Yoruba), of the French colony of

Dahomey, and part of German Togo-land, and that it borders the Niger river, the south-eastern portion reaching to the lower navigable river. Commercially, its value is not at present great, since the free-booting propensities of its people have not only rendered the export produce of the country insignificant, but have closed the trade routes, and to a great extent prevented traders from passing through the country. Its chief commercial value lies in its geographical position, midway between the trade centres of Salaga and Yendi in the west, and of Kano and Nupe in the east—centres which have been connected from time immemorial. The markets of Moshi and Gurma in the north are similarly separated from their outlet to the coast by the country of Borgu, so that if once the plundering bands can be checked, and safety to life and property ensured, the trade in transit through Borgu may become of considerable commercial importance, and even the products of the country itself—a valuable indigo, exceptionally good tobacco, cotton, and various drugs and gums—will undoubtedly grow in volume and importance. Geographically, the country does not present any features of marked interest. It is an undulating country, with few and small hills, and no large rivers. The watershed is towards the Niger, which forms its eastern boundary, and the most important rivers are the Moshi (which in the last 50 miles or so forms the southern frontier of Borgu) and the Ori, which rises near the capital, Nikki, and reaches the Niger in Bussa's territory. In the extreme west the watershed would appear to be towards the Volta. Geologically the country is extremely uninteresting. Masses of grey granite alternate, or appear simultaneously with the copper-coloured, honeycomb lava which forms the prevailing feature of West Africa as it does of the greater part of British East Africa. This "iron-stone" derives its colour from the very great percentage of iron which it contains. It is smelted by the Yorubas, the Nupes, and most of the other industrial tribes of this part of Africa, who obtain from it great quantities of metal. This (as in the case of the iron-smelting tribes around Ruwenzori) they make into hoes, which become a form of currency. The hoes are locally turned into spears, axes, arrowheads, etc., according to the requirements of the purchasers.

It is, perhaps, from an historical and ethnological point of view that Borgu, or "Bariba," is most interesting. The latter is the name almost invariably used on the spot to describe both the people and the country. Borgu, I believe, merely means "the grazing or grass lands," and has been applied to more than one district in Africa. Much confusion in geographical nomenclature has resulted from travellers having adopted these descriptive titles as the proper names of places or objects. Thus, Niam-Niam, Yam-Yam, etc., signifies, I believe, "cannibals;" Nyanza, Nyanja, Nyassa, etc., merely means "water," and is applied equally to lakes and rivers, as is the similar title Bweru, Dweru, etc.; while Mwuta

'Nzige is a spurious Swahili name which has been given to more than one lake, and means only "impassable to flights of locusts." Much interest, however, attaches to the real name of the people, "Bariba," for it would appear to connect this tribe with the great southern migration which is supposed by some to have taken place from the Barbary States; one location of these migrating tribes was probably in the district near Lake Chad, now known as Bornu, for there too the name of Bari-bari appears locally. Many of the Borgu towns bear this name, which is obviously a traditional one. Time does not permit me to trace the most interesting successive migrations of various tribes which have established the ethnological characteristics which distinguish this part of Africa to-day. Dr. Barth, and more recently the distinguished French traveller Captain Binger, are a mine of information on these subjects.

HAUSA TRADERS.
(*From a photograph by Dr. W. H. Crosse.*)

It will be sufficient to merely allude to the great southern movement of the Fulas (or Fellatas), who belonged apparently to the Ethiopic (Abyssinian) stock, whose ultimate origin was most probably Asiatic. It is from this stock that the pastoral tribes of East Africa are descended—nomad cattle-owners ever ready to fight in defence of their flocks and herds, who conquered all the Bantu negroid tribes whom they met in their onward march in search of pastures new. Distinguished from the negroid tribes alike by their thin and wiry physique, their aristocratic profiles, and their wavy hair (which formed a marked contrast to the heavy massive build, the flat noses and prognathous type of face, and the woolly scalp covering of the negroids), their descendants of to-day, the Somalis, Gallas, Abyssinians, Wahuma, and perhaps Masai in East Africa, and the Fulas of West Africa, still show all the characteristics

of a conquering race. In West Africa they founded the Sokoto empire, whose dependencies include the great provinces of Yola, Nupe, Ilorin, and Gando. Further to the west, in what is now the French colony of Senegal, they met with one of the finest of the negroid tribes, as in the parallel case of Uganda. From the admixture of the two have sprung the stock which founded the kingdoms of Ahmadou and Samory, whose Sofa armies have maintained for twenty years a singularly courageous though unequal conflict with the arms of France, and still to-day remain unconquered.

One comparatively small country alone stood out against this tide of Fula conquest. The advancing wave of nomad warriors dashed itself in vain against the bulwark of resistance offered by the unconquered Baribas of Borgu, till, spent with the useless struggle, it turned aside to expend its energy on the subjugation of the countries which surrounded Borgu on all sides. Later on in the chapter of African history a new foe arose. Behanzin of Dahomey, with his Amazon warriors, and his contemptuous disregard for human life, spread the terror of his name in letters of blood. Armed with muskets, his woman-warriors carried carnage and victory far and wide, till the name of Dahomey was as that of "hell let loose." But Amazons fared no better than Felatas, and Borgu, though fronting Dahomey all along its southern frontier, remained unconquered. Nor yet, as I have already said, had any European succeeded in penetrating to Nikki, the fetish capital of this strange people. Duncan and Wolf had alone passed through the middle of the country; neither of them ever came back. It was, therefore, a singular piece of good fortune that it should fall to my lot to break through this barrier of exclusion, and, as the first European who had set foot in Nikki, that I should be the precursor of the French and German expeditions which immediately followed.

After leaving Kishi, we again passed through a long stretch of uninhabited jungle, into which men came in fear and trembling even to cut firewood—for the name of the Baribas is a terror in the land—and arrived at the first large Borgu village, where lived the chief of Kiama. Whatever may have been his original designs, Kiama and I became real friends. I was greatly struck with his fearless bearing and aristocratic carriage. He visited my camp alone and unarmed by night, and on more than one occasion I reciprocated his confidence by a midnight visit for a friendly and uninterrupted chat. Such a meeting occurred the night before I left, when he warned me that he had positive information that a robber chief with 600 warriors had planned to attack us by an ambush near one of the swollen streams we had to cross. He implored me to consider whether I was strong enough to go forward. Should I decide to do so, he heartily wished me success and victory; but if I judged it best to return, he would see me safely out of Borgu. At the same time, with every evidence of sincerity, he warned me never to

trust myself alone and unarmed at night in a Borgu village as I was now doing, for above all things the Borgu were a treacherous people, and no other chief would resist as he had done the temptation which such an opportunity offered.

I wish I had time to tell you more of this chief, for whom I had conceived a real liking, and of our life during our week's stay in Kiama. We made a treaty together, and, as in the case of every treaty I have ever made in Africa, every single clause was elaborately paraphrased and translated and explained to the utmost of my ability. I have absolute confidence that nothing would induce that Borgu chieftain to swerve from his part of the compact.

On October 25 we left Kiama in the usual deluge of rain, and our progress was made very difficult by the continual streams which had to be crossed. Fortunately there were no big rivers, and one stream only had to be bridged, though others were up to and above the men's necks.

The expected attack was postponed, probably, I think, because our intending plunderers deemed it a certainty that the king of Nikki would forbid our advance as soon as we came within hail of his town, and we should then either have to fight our way forward, or retire with all the obstacles we had crossed to be surmounted once more. In either case the marauders would have more ample leisure to choose time and place for their purpose, and would not run any risk of incurring the displeasure of the king of Nikki by executing their design; in fact, a strong contingent from thence would assuredly be available to assist in it. Accordingly, I received a message when yet some two or three days' march from Nikki, directing me to come no further. The king's chief fetish-man, I heard, had foretold that if Europeans came to Nikki, the king would die within three months of setting eyes upon them. The medicine-man was supported by a very strong party, who were determined to prevent the approach of Europeans. To this message I sent back a reply couched in terms which I judged would most appeal to the character of a Bariba chief. I came, I said, simply as a friend, with letters of introduction from friends. All the reports which had preceded me could only have been in one sense, viz. that no smallest quarrel had ever taken place between my party and the people of any village I had passed. Every ear of corn had been fairly paid for. Africa was large, I added, and many attractive districts lay both to the north and the south. If he wished none of us, it mattered nought to us; the loss was his, not ours, and we would travel in a more friendly and more hospitable country. We were solely a peaceful mission, though if we were attacked we would fight, and fight hard.

This assumption of indifference had just the effect I expected on the proud chief, backed as it was by messengers from Kiama and from the town at which I was halted, who urged that no other chief had died because of our advent, and begged the king to receive so friendly

a traveller. So we received a message of welcome and invitation, and on November 5 arrived at Nikki. Here fresh difficulties awaited us. The king demanded the present he had been accustomed to receive from Hausa traders in return for permission to visit the town. I refused, saying I was no trader and would pay no blackmail; I came at his own invitation and as his guest. When he sent me the customary small present of welcome—the "gift of water," as it is expressively styled—then, and not till then, would I send my return present.

Matters remained critical for two or three days, and no present of water arrived. But meanwhile I had made a friend in need, and he proved himself a friend indeed. This was the "lemam," or Mohammedan missionary, who resided in this pagan town, and had much influence in the councils. Through his unwearied efforts all turned out well, and the king, whose extreme age had rendered him blind and very infirm, deputed some three or four of the leading men—including my firm friend, the lemam—to negotiate the treaty. This was done in a most intelligent way; each clause was discussed in all its bearings, and questions of a shrewd and practical nature were asked. Then, before leaving, I sent the handsome present of which I was the bearer. The king was delighted, and gave me letters ordering every one to place the whole of their resources at our disposal; to help us forward by all means in their power wherever we might wish to go, for we were now friends allied by a serious and important compact, and all Borgu was henceforth open to the British. All promised well, but I had already learnt that the chiefs of the country have no control whatever over the large lawless bands of highway robbers who plunder the caravans and render the trade-routes unsafe. It is the old African story, so familiar to us in the case of the Matabele and the Masai—the older men and constituted chiefs friendly and peaceable, the young warriors eager for plunder and bloodshed.

The night before we left Nikki I again heard of the intended attack. The grass and "bush" were still dense and high and as yet unburnt, and the streams difficult to cross. At the third march out of Nikki the reports took definite form, but so rapidly had we marched that they had not, I have good reason to believe, been able to concentrate the full strength they had intended. The chief of the town was our friend, and did his utmost to prevent the attack, sending me at last a midnight message of warning when he found his efforts of no avail; but the lawless bands who had assembled were bent on loot, their cupidity was excited by the value of the presents we had produced from our bales, and they looked upon us as an easy prey, for our forty rifles escaped notice among the mile-long line of unarmed carriers.

Africans as a rule detest and dread night fighting; they also have a very great fear of dividing their forces, preferring always to fight *en masse*, and should their enemy succeed in separating them, it is almost

always the precursor of defeat. I attribute the successes of the Borgu to two causes. First, their reputation for a knowledge of witchcraft and of deadly poisons, which renders their poisoned arrows very dreaded. Second, to their fighting tactics. So far from dreading to separate their forces, their custom, I am told, when they attack by day, is to make a feint of attack simultaneously on front and rear, reserving the bulk of their strength for a strong attack on the centre of a long caravan. This mode of attack by ambush would generally succeed in dividing their enemies' forces and inducing panic. They, however, love most to effect a night surprise.

Baffled in this latter attempt by the midnight warning I had received, they awaited us as we left camp next morning at daybreak, only to receive a very handsome thrashing. But it was harassing work. From daylight to dark the previous day I had marched in a really

VILLAGE ON BANK OF NIGER.
(*From a photograph by Dr. W. H. Crosse.*)

blazing African sun, for the rain had now ceased and the heat was very great; all night I was patrolling camp with the strain of anxiety and responsibility which the situation naturally produced, to be followed by a similar day of hard marching and work (with a fight and a wound by an arrow thrown in), with a fresh rumour of attack by night. And this continued. Our destination was the southern frontier of Borgu towards Yoruba and Dahomey, for I was anxious to verify the frontier in this direction, and to personally ascertain whether my treaties already concluded held good to the extreme limits of the country.

We arrived at Ilesha on November 27, and were again received with every demonstration of hospitality. The local chief, who was, I understood, brother of the chief of Nikki, insisted strongly that he was entirely bound by the treaties I had already concluded. He and

his chiefs were, moreover, thoroughly satisfied with their contents, and voluntarily requested that some evidence of the fact should be in their hands, which they could produce in case any other Europeans came; for they knew all about the national distinction between French and English, since their town was situated on the borders of British Yoruba and close to French Dahomey. They told me of the expedition which had proceeded into Borgu from French territory, and said it consisted of 1500 men.

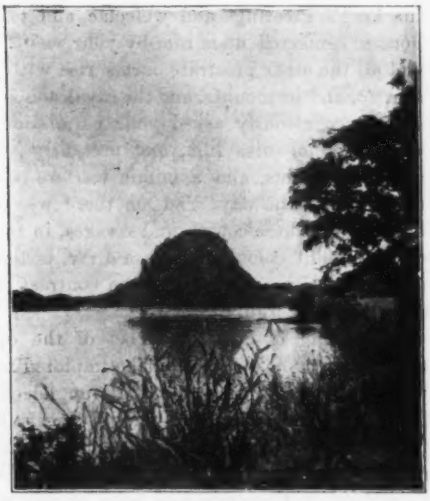
Negotiations of all sorts are tantalizingly slow in Africa, and the usual week had elapsed before we were ready to resume our march. It had been my intention to proceed further to the west, but the last few days had developed a very grave situation. Looking back on the events of those months, it seems to me that the Borgu freebooters, taking no heed to the occasional rifleman whose presence was masked by so great a throng of unarmed porters, had concluded that a benign Providence had sent into their country a vast assortment of valuable goods which was theirs for the taking. Their previous rebuff only stimulated the desire for reprisals, and hope deferred whetted their appetite for plunder. Rumours, which hourly grew into certainties, reached me that from every side bands of the freebooters were collecting like vultures who scent a feast.

More than two-thirds of my men, harassed by the nightly rumours of attack, became panic-stricken, and refused to march onwards. But desertion meant certain death or slavery, and their dilemma was pitiable. "We are but poor unarmed porters," they said, "working for our daily food; we are no fighting men, nor were we enlisted or given arms to fight. It is death to go on." I felt keenly for them, but I hardened my heart, and replied that never yet had I been dictated to by those I was sent to command. They had enlisted for an expedition, and were bound to go where the leader took them. If there was danger, we shared it equally. If they deserted me, I would burn the loads as they stood, but I would carry out my decision whatever it might be.

There was, however, a still more awkward dilemma. I had asked for some further supplies of barter goods to be sent to meet me at this point. The caravan would come wholly ignorant of their danger, and whatever might happen to my expedition, there would be little doubt that the other would be annihilated. An onward march without these supplies must be greatly curtailed, and would result in but meagre results at best, while trebling the total cost. To wait was impossible, to return and meet the expected caravan equally unfeasible, for neither love nor money would induce the bulk of the men to return once they had reached a safe haven. The choice lay between an onward march with the onus of the fate of the other expedition on my shoulders, or a return to the Niger. After a night of sleepless thought, I decided on

the latter. Our camp was full of spies watching to make sure which road we should take. Every road was equally in their power. Seventeen miles through dense bush without a village separated us from the friendly frontier town of Saki, in Yoruba, but this road was particularly open to ambush and attack. I procured guides to go in the opposite direction, and made such careful inquiries regarding that route as convinced the Borgu marauders that I had finally made up my mind as to my intentions.

The hostile bands started overnight to take up their posts for the ambush. But, as I have said, during the long hours of the night, while constantly on the alert to see that my sentries were awake, and that everything was ready for an emergency, I had come to the decision to march for Saki.



JEBBA ROCK.
(*From a photograph by Dr. W. H. Crosse.*)

We had started for the north-west, and disappeared in the thick bush, to the obvious delight of some on-lookers, when I gave the word to the guides to make a *détour* for the path which leads due south to Saki. Marching straight through the jungle in the required direction, we presently struck the path, and after a hard 17 or 18 mile march arrived close to Saki.

The King of Ilesha had sent his grandson as our guide, and this young gentleman naïvely admitted, I was told, to my interpreter that his own retainers were amongst the crowd who had gone ahead to waylay and plunder us, and who had been so completely "sold." The treacherous young scoundrel would have played, of course, into the hands of his allies; but finding that the plan had been foiled, he made no concealment. The King of Saki also told us that he had heard of the matter, which apparently had been widely spread throughout the whole country, and that the combination against us was in overwhelming strength. His astonishment at our arrival safe and unscathed was very great.

It was extremely pleasant to be back in Yoruba. The really gentlemanly manners, the extreme courtesy and hospitality of these people,

are more marked than I have ever seen elsewhere in Africa. At a distance from the town you are approaching, one of the highest chiefs deputed by the local king will meet you mounted on his war-horse, a diminutive pony smothered with quilted housings and *jujus*, or charms, to avert danger from horse or man. As the cavalcade approaches in its gorgeous trappings — for these Yorubas affect robes of costly cloth, velvet and damask, and caps of plush—the head of the deputation will dismount, and, with great gravity and precision as befits his years and his stiffening joints, will slowly proceed to lay himself completely flat on the ground and rub his venerable face in the dust, the while inquiring how you have fared on your journey, how you slept last night, and such other courteous phrases as may occur to him. He then conveys his king's greetings and welcome, and tells you of his delight at the honour conferred upon him by your visit. Painfully the old man rises, and all the other prostrate forms rise with him; his attendants hold his stirrup, and he mounts, and the cavalcade is reformed and leads the way. Having courteously asked your permission, leave is given to the escort which accompanies him, and presently volleys are heard from their ancient muskets, and a mimic warfare is carried on in celebration of the event of the day. To me there was a sense of incongruity in the obeisance of these courtly old savages, in their robes of snowy whiteness or of brilliant colours, before a dirty, tattered, and unimportant-looking individual like myself; but the contrast was a pleasant one after the amenities of Borgu.

The king of Saki was glad of the opportunity to enter into an alliance with the British, but he implored me not to proceed on my way until he could provide me with an adequate escort, for between his fortified town and those of middle Yoruba lay a stretch of uninhabited jungle, which was constantly occupied by large war-camps of the Borgu raiders, to the terror of the peaceful Yoruba traders. Not long before, he told me, a European had been on his way here from the south, to whom he had sent messengers imploring him to await an escort which should follow. The European — a Frenchman named M. Hess — pooh-poohed his friendly offers, with the result that the Borgu fell upon his caravan and dispersed and looted it, and the Frenchman himself was hit by a poisoned arrow and died. Saki feared that blame had been attached to him for this disaster, and deplored the possibility of a like catastrophe happening to us. Even here in our camp outside the walls of Saki, we were not safe from a night attack from these marauders, and the necessity for vigilance was as great as ever.

Dense fogs, amounting often to Scotch mists, made the work of looking after sentries, etc., by night a disagreeable task, and the stress of work by day and night at last induced a somewhat severe attack of fever, so that I was not sorry to prolong my stay for a couple of days, by which time the escort was ready. To my surprise, some four hundred

armed men turned out, led by all the chiefs next in importance to the king, and even his own confidential slaves were included. This robbed the town, situated though it was in the midst of hostile bands, of its leaders and almost the entire fighting strength, though the king himself was seriously ill.

Africa has been talked of and written of from almost every point of view, but among its as yet unwritten chronicles there is many such an incident of disinterested generosity which travellers have forgotten to record. The description of Africa which we often hear, as a land of mere swamp and desert and malaria, is no more applicable to its often exquisite scenery, its mountains and salubrious uplands, its lakes and its forests, than the similarly loose description of its peoples as blood-thirsty savages and cannibals is applicable to such a tribe as the Yorubas. Here on this platform, some three years ago, it was my privilege and my pleasure to record more than one instance of heroism which I had seen in East Africa, and what I have just said will, I think, prove that generosity also is not an unknown virtue there.

We passed on through the large towns of Iseihin and Oyo to Ikirun; where I met Commissioner Bower, who was engaged at the time in negotiations with the Emir of Ilorin, regarding the adjustment of his frontier towards the Lagos protectorate. As Ilorin—an outlying province of the Sokoto empire—is under treaty with the Royal Niger Company, I offered my services to promote the solution of the difficulty in a friendly spirit, for some friction had arisen between the Emir and the British Commissioner. The result was that Captain Bower and myself proceeded on a joint delimitation of the Ilorin frontier, and spent a few very pleasant days together. When with very great regret (on my side, at all events) we parted when our task was done, I turned north with my expedition, and reached my starting-point at Jebba on January 12 last. Here we paid off and dismissed our men, to many of whom we had formed a considerable attachment. Numbers came to bid us farewell and declare their eagerness to follow us anywhere if we should return to travel elsewhere in Africa, and some few seemed to show a genuine sorrow at saying good-bye.

These porters consisted of three different tribes in almost equal proportions. Of the Nupes I have little to say in praise. They added almost daily to our difficulties by grumbling at their food, mutinying from fear, and by constant and hourly quarrels and fights. But the Yorubas and Hausas were of very different stuff. Of the former I have already spoken. As a race they are exceptional for their industry and their skill both in agriculture and in mechanical work. They have a passion for trading, and are extremely intelligent and fairly plucky. I regret to say that it is this fine race—one of the finest in West Africa—which is being demoralized by the importation of millions of gallons of the cheapest and most noxious of spirits from Hamburg and Liverpool.

This import strangles legitimate trade, and leaves the native worse off for his contact with British merchants. In return for the vast export of palm oil, together with rubber, capsicums, shea butter, indigo, and other produce, the Yoruba ought, after the lapse of so many years, to be in possession of abundance of cloth and useful European articles, instead of which he has as a rule only a heritage of empty gin-bottles and an enfeebled physique to hand down to his posterity.

The Hausas, though as a rule probably less intelligent than the Yorubas, are undoubtedly one of the most interesting of the races of Africa. They too are born traders, and conduct their own trade caravans for hundreds of miles from their head-quarters at Kano and Sokoto. Their language has become the *lingua franca* of West and North-West Africa, from near the shores of the Mediterranean to the basin of the Congo. Hence it is a matter of the first importance that this language should be well understood by those who seek to enter into relations with the great Hausa-speaking tribes, whether it be for purposes of commerce and trade, or for missionary and philanthropic effort. Hausa is usually written with the Arabic alphabet, and having reached this point of development, it becomes feasible for Europe to create a Hausa literature, which may have a considerable effect on Mohammedan thought in the embryo literary centres of Kano and Sokoto, etc. The "Hausa Association" has done invaluable work in this connection, and I had the pleasure of meeting in Africa Mr. Robinson, the Hausa student, who has gone to the Sokoto territories to study the language under its auspices. The association have been fortunate in obtaining the services of a man who presents the rare combination of exceptional linguistic talent, a perfectly fearless traveller, and an iron resolution. He gave me a specimen of the kind of pamphlet which he proposed to distribute; I allude to the manner of writing, etc. It will be a new departure in the progress of Africa if the educated Moslems of the Central Sudan become dependent for their literature on English printing presses; but I trust that efforts may be made to substitute the Roman for the Arabic alphabet, by printing the Hausa text collaterally in both forms.

I had hoped to have been able to say a few words on many other subjects of great interest in West Africa, and to detail at greater length the customs, mode of life, buildings, weapons, arms, and utensils of the Borgu and Yoruba people, but I have already, I fear, trespassed too long on your patience. I would have liked also to have spoken of the marked points of contrast between the savage tribes of East Africa and the curious semi-civilization introduced by the Mohammedan religion, which has at least had the effect of welding into kingdoms and empires the populations of these countries; and of introducing to you Mr. Mottram —one of the two comrades who accompanied me on this little expedition, and to whom its success is largely due, but unfortunately he is laid

up with an attack of African fever. I regret that Mr. Reynolds, the third in our party, is still in Africa. The untiring energy and loyalty of both these officers it is a pleasure to recall, and I need hardly say that from first to last it was these qualities in my comrades which made work a pleasure, and rendered even formal orders a thing, I think, wholly unknown between us.

Before the reading of the paper, the Chairman, Sir GEORGE TAUBMAN GOLDIE (Vice-President), said: As you know, it is our custom here that, when a paper is going to be read to the meeting, your President, or, failing him, a Vice-President, should make some prefatory remarks, introducing to the meeting the traveller who is to read the paper. In the present instance this procedure seems to me rather superfluous, because I feel sure that Captain Lugard is far better known to most of you than his introducer; but as I must not depart from our established practice, I will draw your attention to one point, which might perhaps otherwise be overlooked. I believe that to many people in this country the name of Lugard in connection with Africa summons up only an idea of Uganda, and that is very natural, inasmuch as the creation of that new province was so largely due to his energy, his courage, and his skill; but all of you who have followed the course of African events during the last ten years are aware that Captain Lugard's experiences in the Dark Continent have by no means been confined to what is generally called East Africa. So long ago as 1885, during the Suakin campaign, he had executive charge of the transport arrangements, which must have brought him into close contact with the natives; later on, in 1888 and 1889, happening to be in Nyasaland, which at that time was threatened by the Arab slave-traders, he initiated, organized, and led important expeditions against them, but for which I doubt if there would have been left there any European settlements to develop as they have since done into what is now known, I cannot tell why, as British Central Africa. I mention these facts, not by way of commendation of Captain Lugard—for, as you know, good wine needs no bush—but because at the moment he is about to read to us a paper on a recent visit to the western quarter of the continent, and it is well to remember that the value of the impressions he has brought back must be immensely augmented by his capacity to compare them with corresponding impressions gained in many other parts of the continent, in South Africa and North Africa, as well as East Africa; in fact, I cannot doubt that it is Captain Lugard's wide experience in Africa, and his services to civilization all over the continent, that have been the cause of his being honoured by her Majesty with the mark of distinction which I saw announced in this morning's paper.

After the reading of the paper, the following discussion took place:—

The CHAIRMAN: Before we return thanks to Captain Lugard for his delightful paper, it is customary to invite any gentlemen present to enter into discussion upon it, and I should like to be allowed to call upon one gentleman present, M. Dhanis, who is well known in connection with the Congo basin, and practically restored order in the Free State, and gave it security. I am perfectly aware that the Congo and Niger are not the same places, as some French newspapers evidently believe; but you must remember that the physical conditions are very much the same everywhere in tropical Africa, and I have no doubt that Baron Dhanis can give us some valuable remarks.

Baron DHANIS: I thank you very much for the kind notice you take of me, but I beg you will excuse me making any remarks on the very remarkable paper I have just heard from Captain Lugard. We all in Belgium have followed the

work of Captain Lugard, and I am very happy to be present this evening to be able to applaud him also. I hope you will excuse my making any further remarks, as I am not accustomed to speak in English, and, besides, I am not at all prepared this evening.

Mr. RAVENSTEIN said that they must all feel delighted to have Captain Lugard once more among them. The excellent work done by him in East Africa had at last been recognized by the public, and he felt sure they were pleased that he had been equally successful in the region of the Niger. That river had eluded the grasp of the geographer for centuries, and although the old maps showed unmistakable indication of a big delta at the bottom of the Gulf of Guinea, theoretical geographers had connected the Niger with a big lake, or even with the Congo. It was, in fact, only during the present year that the entire course of the river had been found.

Captain Lugard, by crossing the routes of former explorers, had done excellent service, and, by combining his work with that of his predecessors, we were now able to construct a fairly accurate map of the country. A German expedition, starting from the Togo country, had met with equal success, further north, in Gurma. This race between British, French, and German explorers, the distribution of flags, and the signing of treaties, might cause diplomatic difficulties, but they, as geographers, had every reason to rejoice. He hoped that Captain Lugard would still be afforded many opportunities of distinguished service as a geographical explorer, and of serving his country in the true interests of humanity.

Dr. CROSSE: When I heard that I was to have the honour of being asked to speak to such a distinguished audience, I felt extremely nervous, and inclined to decline the honour. However, I feel I must not lose this opportunity of telling you what I can of the Niger territory. I went out when the charter was granted to the Company, and where, in 1886, there was suspicion of the European, there is now confidence; where intertribal warfare used to be the rule, it is the exception; where human sacrifices were so enormous in number that often, in my own small village, Asaba, 150 miles up the river, no less than 1000 to 1200 people were killed every year for sacrifices, to-day there is not one person killed. This is one result of the charter administered by the Royal Niger Company, as represented by our worthy chairman, Sir George Goldie.

The CHAIRMAN: I now rise to propose a hearty vote of thanks to Captain Lugard for his most delightful address. A letter was received to-day from Colonel Monteil, stating that, owing to the late debate in the French Chamber, he very much regretted he was unable to be present to hear Captain Lugard's paper. I also have to tell you that two or three days ago a very remarkable confirmation arrived in England of the statement I heard Captain Lugard make as to his friendship with the King of Kiama. A few days ago a letter arrived from that king, marked very urgent, in which he informs the Niger Company that since Captain Lugard had left, the French had come upon him with force, and he hoped Captain Lugard would support him. I only mention that to show that Captain Lugard was justified in referring to the amiable manner in which the King of Kiama received him and parted from him. I have now only to ask you to join in a vote of thanks to Captain Lugard, which I know will be unanimous.

Captain Lugard thanked the meeting.

The CHAIRMAN: There are some very excellent maps of Captain Lugard's in the next room, showing the routes he worked out during this journey. They came out within one per cent., although based on paces only—a remarkable result.

NOTE.—A few photographs of Borgu by Mr. Mottram, and of various parts of the Niger by Dr. Crosse—who for some nine years has been the senior medical officer in the Niger Company's service, and has shown a devotion to his work which is the theme of every one who has ever visited the Territories—were shown on the screen.

NOTES ON WESTERN MADAGASCAR AND THE ANTINOSI COUNTRY.*

By J. T. LAST.

IN this paper I wish to put on record some of the chief points of interest connected with my journeys and explorations along the west coast of Madagascar, and also some account of the south-central districts, inhabited by the Antinosi immigrants from the country near Fort Dauphin, on the south-east coast. The primary object of my expedition was to make collections of Lepidoptera, to which I added that of collecting other objects of natural history, and of obtaining general information about the country, people, and places as circumstances permitted.

Sometime previous to my visit to Madagascar I had been engaged in similar pursuits in East Africa. Leaving East Africa, I went by mail to Zanzibar, where I made a few collections in natural history, and also preparations for a lengthened stay in Madagascar.

On July 2, 1889, I embarked, with a party of six Zanzibar men, on board the French mail steamer *Amazone*. In three days we had reached the rocky mountain mass of Mayotte, one of the Comoro islands, and on the next day we dropped anchor at Nosi-bé. The island of Nosi-bé is situated off the north-west coast of Madagascar, a few miles from the mainland, in about long. 46° 15′ E. and lat. 13° 20′ S. It is some 15 miles long between north and south points, and about 10 miles in extreme width, and forms part of the eastern side of Pásindáva Bay. The extinct craters show the volcanic nature of the island. Of these there are several, some in perfect form, especially one a little to the north of the town of Hellville; the cup-like sides of this is covered with a thick forest, and there is a deep lake at the bottom. In the south part of the island rises the high mountain mass of Luku-bé. This is covered with a fine forest of magnificent trees, palms, bamboos, and other growths. The soil of the island is fairly good, and sugar-cane has been largely cultivated for the manufacture of sugar and rum; but, owing to the heavy taxes and the difficulties of getting labour, many of the proprietors find it most difficult to make their business a paying concern. The island was formerly in the hands of the Sakalava tribe of Malagasy, who, to avoid falling into the hands of the Hovas, sought the help of the French at Bourbon, and in 1840, placed themselves and their country in their hands. The next year the French took formal possession of Nosi-bé, and have held it ever since.

* Maps, p. 300. The coast-line has been taken from the latest Admiralty chart.

Hellville, the chief town in Nosi-bé, and the seat of the French government in the district, is built on a point on the south side of the island. The main street is occupied by the official buildings and a few shops. The rest of the town is occupied by a mixed population of various Malagasy tribes—Betsimisarana, Sakalava, Hova, and others; with these there are also a number of Makuas from Africa, Swahilis from Zanzibar, and Antilotis from the Comoro islands. The government buildings and principal houses of the town are built of stone, some few of boards; the others are all of light material, chiefly the leaf stalks and fronds of the various palms which grow about the country. These latter buildings are very inflammable, and it is no uncommon thing to see the whole or greater part of a town destroyed in one blaze.

The rather important town of Máradúka (many markets) lies in a small bay a little to the south-east of Hellville. This place is inhabited almost entirely by Hindi traders, Makuas, and other Swahili-speaking people. It is a very dirty hole, but a considerable amount of business is done here, with the people of the mainland, in hides, rubber, ebony, and other things.

Nosi-bé can scarcely be considered a healthy place, especially about Hellville, where the back part of the town is built on the banks of a wide, steaming, muddy creek. The French have built here a strong pier and landing-place, and extensive coal-sheds for the use of their men-of-war, which are frequently here; and also the mail steamers of the Messageries Maritimes, which call here every month.

I was engaged for about two months collecting in Nosi-bé and the adjacent islands of Ambári-vátu and Táni-kéli. Ambári-vátu is a conical-shaped hill of about 2000 feet high, rising out of Pásindáva Bay, a short distance to the south of Nosi-bé. It is well wooded all over, but very rocky, quite unsuitable for cultivating anything. There are a few small Sakalava villages near the beach, but the natives depend more on their fishing to supply their wants than on anything they can grow. Lately the crown of the hill has been cleared, and the French governor of Nosi-bé has built there a kind of country house and sanatorium.

Táni-kéli is a much smaller and less elevated island nearly in the middle of Pásindáva Bay. It is of undoubted volcanic formation, and its beautiful vegetation of palms, ferns, orchids, and other plants, are well worthy of a visit from any botanist who may happen to be in the neighbourhood. At the west end of the island there is a large colony of bats, a species of pteropus or fox bat. These all hang sleeping during the day; as the evening comes on they all stream off to the adjacent country in search of food. The morning finds them all back again at the same trees; nor, even if they are disturbed, do they quickly forsake their old haunts and seek fresh ones.

It was now time that I should begin to explore and collect about on

the mainland; but before doing so it was necessary I should go to Anórontsánga and see the governor-general Rakotovau, and obtain from him letters of introduction or passes to all the subordinate governors and officers in his district. This is a large tract of country extending from the river Andránu-bé a little to the south-west of Nosi-bé, to the river Máivaránu, in about lat. 14° 35′ S. This includes more than 100 miles of coast, and inland there is no definite boundary. The whole of the district, excepting some few flat places near the coast, is exceedingly hilly, and in some parts lofty mountains raise their heads to a height of 6000 or 7000 feet. It was my wish to visit as much as possible of this district, and to do this it was necessary that I should have at least the good-will of the Hovas, even if I did not get any actual help from them. To secure this it was necessary I should see Rakotovau, the governor-general at Anórontsánga.

Anórontsánga occupies an important situation in Rafála Bay, at a distance of some 45 miles or more to the south-west of Nosi-bé. It can be reached from Nosi-bé by two routes—one by boat or canoe to Ambúdimadíru, a town at the south extremity of Pásindáva Bay, and the rest of the journey overland; the other way is to go either by large canoe or boat all the distance by water, steering across Pásindáva Bay to Vávatúbe and Kivínji Rock, and then down the coast to Rafála Bay. I decided to go all the way by water, and hired a boat for that purpose. The journey generally takes two days, but, owing to bad winds, the first day's sail took us to a village, Márakúhu, on the west side of Pásindáva Bay, and there we had to anchor. The wind was dead against us. We went ashore, and were made welcome by the natives, who are chiefly Sakalavas, a few Makuas and Antiloti people living with them. A Sakalava queen, Benu, ruled over this district and surrounding country at the time of my visit, but since then it has been acquired by the Hovas, without fighting, but by a little stratagem on the part of Rakotovau. I was told that he, travelling with a large party of men and attendants, professed that he was on a kind of state visit to Queen Benu. Suddenly appearing on the high land above the queen's village, he demanded submission on the part of herself and all her people, or he would blow the place to pieces. He had made a kind of wooden cannon out of a log of wood, and with it so terrified the Sakalavas that they submitted without a shot being fired.

Leaving Márakúhu the next morning, we managed to reach Vávatúbe, and had to anchor. The following morning we had a fine, fair breeze, and quickly rounded Kivínji Rock, passing the islands of Bérávi and Ránza; thence a fine sail along the coast, and we reached Anórontsánga about three o'clock in the afternoon. This is the most important Hova town on the west coast, between Cape Amber, on Búbaómbe, and Mujangá. Anórontsánga is really two towns, the coast town inhabited chiefly by Sakalavas, Makuas, and Swahili-speaking people, with a few Hovas.

Here there is a meat market, a few Hindi stores, Hova rum-shops, and a building used as a church and school. The other part, or town, is a mile or more inland, on the top of a high hill. Here is the residence of the governor-general and other officials, and the place is inhabited exclusively by Hovas. There is a large building used as a school and church, also the usual number of rum-shops and petty-dealers' places.

My first business on landing was to hire a small house, as I intended to remain some few days in the place. After I had done this, and put things in order, I sent a notice of my arrival to the governor-general, and at the appointed time went up to pay the customary visit. Introduced by a Norwegian gentleman, Mr. N. O. Handerwick, who has been many years in the country, and is a personal friend of the governor-general's, I was well received by the Hovas; and when I had stated the object of my visit to the place, the governor-general promised to give me all the necessary passes, and whatever assistance lay in his power.

After the formal part of the visit was over, the governor-general invited us to his private room to take some refreshment, and by his pleasant conversation and questions showed that he took a great interest in the affairs of other nations, and also in my work of collecting. He could hardly understand why people should spend their money and time in simply collecting a few insects and birds.

After this we retired, and shortly after we reached our house, the usual present of food was sent down by the governor. It is the custom, and by order of the queen, that all European strangers, arriving at any Hova station, shall be given a present of food, as soon as they make their presence known. It generally consists of rice, fowls, ducks and eggs. Rakotovau was especially liberal to us, sending us joints of beef as well as the usual present.

The next day Mr. Handerwick and I went by invitation to meet the governor-general and his officers at dinner in the Ruva. The "Ruva" is the fortified residence of the governor. We were most kindly received, and after dinner the governor gave me the passes and letters he had promised me on the previous day, adding that if I should require other passes, or help in any other way, it would be his pleasure to assist as far as he was able.

Judging from my knowledge of him during nearly five years' residence in Madagascar, I have every reason to believe he acted fully up to his promises, and it is with the greatest pleasure I bear testimony to the high character of Rakotovau, 14th, D.P.M., Governor-General of Anórontsánga and its dependencies. In all my dealings with him, I found him to be a good man and honest; of the strictest integrity, a lover of justice, ever ready to assist any foreigner, whether trader or traveller, who will be honest with him, and yet he never forgets his position or duty to his own state and country.

After the introductory visits to the governor, I remained several

days collecting in the coconut plantations and surrounding country, not so much for the collections, but rather that the governor and I might become better acquainted with each other. This was accomplished by an interchange of visits, and a friendship was formed which I continue to value.

Having secured the necessary papers and means, I began a series of journeys to the more distant parts of the district, governed by Rakotovau. The space at my disposal will not allow me to give a detailed account of each of these journeys; I can only here refer to the more important points of interest connected with the country and people.

The three chief journeys I made were—one to the headwaters of the Sámbiránu river; the second took me to the sources of the Manúnguárivu river; and the third, from Andránumaláza through the Ambalíha forest to Békulúsi Hill, which I ascended, and then to Anórontsánga by way of Ankarámi. The Sámbiránu river takes its rise among the mountains some 60 miles inland, a little to the south-east of the longitude of Nosi-bé, and empties itself into the sea near the south end of Pásindáva Bay. Excepting the rather extensive tract of flat country near the coast, the whole of the country through which the Sámbiránu and its tributaries flow is very hilly, and in some parts quite mountainous. The part of the river near the coast is very wide, and, during the dry season, shallow, so that then only boats of a light draught and canoes can be used on it; but during the rains the river is flooded, and boats of 5 or 6 feet draught can be taken a long way up. The principal tributaries of the Sámbiránu are the Ruáména on the right bank, and the Mánambúru and Mbáhatra on the left. These are fed by many considerable affluents, which receive all the streams and torrents from the neighbouring mountains.

The whole of the country drained by the Sámbiránu is very fertile. The lowland near the coast is one large garden, where Indian corn, millet, beans, semsem, potatoes, cassava, and pumpkins are produced in abundance. Of fruit trees every village has its mangoes, guavas, bananas, and others; while fine pine-apples are raised in the garden or near the house. Inland, along the watercourses, and on the mountain slopes, the soil is most productive, and it is one of the most prolific as well as the most extensive rice-growing districts in North Madagascar. During the dry season the minor branches of this river are very shallow, so that their beds are often used as roads between distant villages. Generally there is a path alongside the stream, but people prefer to walk in the watercourse, especially if the pathway in the forest is damp, because of the troublesome leeches. These are most voracious and rapid in attack. The native, who invariably goes about with bare legs and feet, is especially subject to their attacks, and therefore prefers to travel by the river-bed. When obliged to pass through a piece of forest where these pests exist, he arms himself with a piece of moistened tobacco tied

in some rag to the end of a stick. Leeches have a great dislike to tobacco, and a slight touch from the tobacco-stick causes them to drop at once; otherwise they are somewhat difficult to remove until they are quite gorged, and then they drop off. The native would not attempt to pull it off; but if he had not any tobacco, he would give the leech a sharp slap, and then it would fall off.

In the Sámbiránu and all its tributaries, crocodiles abound, especially in the Rúaména; there are also several species of fish in good numbers. The natives catch these in large baskets, but do not seem to know how to use the rod and line.

Up the Rúaména branch, about five miles from its junction with the Sámbiránu, there are four or more very hot springs of water. Two of these rise from among the rocks on the right bank of the river, and make a deposit of a kind of salt all around. This is not eaten by the natives, but they drink the water as a remedy for certain diseases, and the country doctors highly recommend its use. In the middle of the bed of the river there is a huge heap of rocky boulders piled together, and here again there are some more hot-water springs. This place is held sacred by the natives, who have adorned the rocks with poles and flags of red and white cloth. They cannot account for the fact that the springs of water are hot, so they feel there must be something supernatural about the place, and therefore it is a fit and proper place for them to present their offerings and make their prayers. There seems to be a line of these hot springs, which extend from the right bank of the Rúaména, across the country, in a westerly direction to the left bank of the Sámbiránu, where there are a number of small springs of very hot water, and the ground all around is covered with a kind of salt.

The whole of this hilly district was once covered with a dense forest. A great part of this, especially alongside the watercourses, has been cleared away, and the ground utilized as rice-gardens. Every year new tracts are felled and burnt, and new gardens made. In time, the hills will be quite denuded of forest, and the result will be a dry and barren country.

I remained in this district of the Sámbiránu some three months, making various collections. During this time I travelled about from village to village, and was always received with the greatest kindness by the natives; and I ever found them ready to help me, by supplying guides and in other ways. Food was always plentiful. A hungry stranger would never need to leave a village; he would at all times be welcome to such as the natives had, or, if he preferred to buy, he could do so at a reasonable price. In travelling, I passed but few villages without being given something—a bowl of rice, or a fowl, or both; and whenever I slept in a village, the customary gift of food was always presented.

When I had finished my work on the Sámbiránu I went to Nosi-bé,

and shipped my collections home. After a few days' rest, I again proceeded to the mainland to resume my work.

The Manúnguárivu river rises in the lofty group of mountains lying south-east of Ankarámi. This town is situated one day's march inland from Ambúdimadíru, or two days' march in easy stages from Anórontsánga. Both roads are very rough; that from Ambúdimadíru especially so. It is seldom one has such a succession of deep valleys to cross or steep ascents to climb. The whole country along the line of march is very hilly, and covered with a thick forest. Here and there a Sakalava village is seen, partly hidden away in some valley, and others crowning some hilltop. Around these the forest has been cleared away for a considerable distance. Here the natives make their small gardens of potatoes, cassava, and a few other vegetables. The rice-grounds are generally some little distance from the village. Streams and mountain torrents flow in all directions, and lend themselves easily to the work of irrigation, which is necessary for the drier parts of the country.

The Anórontsánga road, though rough, leads over a more open country; it is less hilly and less thickly wooded; there are more villages and much more country cultivated. Three or four considerable streams are passed on the route, and at one of these, attached to the rocks in its bed, I found some splendid oysters of a large size. There are three kinds of oysters about the sea-coast and in some of the rivers of north-west Madagascar. The small oyster, which at low water may frequently be seen in great numbers; there is a kind of pearl oyster, which is only found at a distance from the beach and in somewhat deep water; the third is a still larger kind, only found attached to the rocks in fresh-water rivers—the inside of the shell is much darker than that of the pearl oyster found in the salt water. Leaving Ankárami, we passed round the western foot of a lofty mass of hills, and in two hours reached the Manúnguárivu river. On both banks there are a number of villages and extensive gardens. Here we rested for a while, and then proceeding further up the river, camped in a village on the left bank, and made it our head-quarters whilst in the district. The chief of the village, a Betsimisaraka, was very kind, and insisted on my using his house, the best in the village, until I had finished collecting in the neighbourhood.

During the two months I spent in this district I examined almost every stream and rivulet forming the headwaters of the Manúnguárivu. The two main branches each drain an enormous crater-like basin. That on the right bank is formed of hills some 3000 feet or more high, and encloses a cup-like hollow quite three miles in diameter. Its sides are well wooded, and numerous streams descend from all parts, to meet at the bottom, where they form a considerable river, which flows out through a large gap on the south-west side of the hollow, and runs on to the Manúnguárivu. In this huge hollow there are several villages inhabited

by Sakalavas, who have cleared away large tracts of forest, on which they raise rice in abundance and sugar-cane grows luxuriantly.

The principal affluent on the left bank is fed by streams which meet together in a much larger crater-like formation than that just described. The mountain-sides rise to a height of some 6000 feet or more, and they enclose a hollow of from 10 to 12 miles in diameter. There is a large break on the north-east side by which the waters escape, and, flowing round to the north-west, enter the Manúnguárivu. The whole of the basin and the mountains on all sides are covered with a densely thick forest of fine trees, rubber-vines, and other creepers, bamboos, palms, and undergrowths. This extensive hollow is uninhabited except by the wild boar-fusa (*Cryptoprocta ferox*), several species of lemuroids, and some smaller forms of animal life. The natives prefer to live along the banks of the river, where they have a much more open country, especially lower down and outside the mountain mass, where there are large tracts of flat country well adapted to the cultivation of both rice and sugar-cane. This latter article is in great demand with the natives, who use it extensively in the manufacture of rum as well as a common article of food. After leaving the mountains, the Manúnguárivu flows in a south-west direction, joins with the Andránumaláza and empties itself into Radáma Bay. Excepting in the wet season the river is very shallow, and can only be navigated by canoes and boats of very light draught.

When I left this district I went by road to Anórontsánga. The French mail steamers used to call at this place in those days, so I was able to ship my collections home. Afterwards I undertook another journey from Anórontsánga to Andránumaláza, and thence through the Ambalíka forest to Békulúsi, and back to Anórontsánga by way of Ankarámi and Bézávuna. We went in a hired boat from Anórontsánga to Andránumaláza. We had hoped to reach the place in one day, but soon after entering Radáma Bay we stuck on a mudbank, and as the tide was running out, we had to remain there till it rose again. I need hardly describe the discomforts of such a position; any one who has been unfortunate enough to have to spend an evening in or near a mangrove swamp swarming with mosquitoes, can form some idea of our situation. The next morning we reached Andránumaláza, presented our passes and proceeded on our way. This took us to the left bank of the Manúnguárivu river, and towards evening we camped just under the south side of a remarkable hill, named Anguruni. This is an isolated mass, and in the distance has the appearance of a huge building raised in terraces. The next morning we went on. After passing through some forest we came to the villages of Anúnuláva. We rested here for some time, and then followed a path which took us over a rough forest country, and after descending a narrow precipitous spur of the hills, we arrived in the Ambalíha valley. Villages are

scattered all about the valley, and a good-sized river passes through its length, and goes on to join the Andránumaláza. River, valley, and villages all take the name of Ambalíha from the fact that "valiha" (bamboos) are the most prominent feature in the vegetation round about.

The villages are inhabited entirely by Sakalavas, who were very civil to us, giving us the information we wanted and some sugar-cane into the bargain. As we proceeded up the valley, we came to a village quite deserted. The people were all away in their distant plantations, and would not return for a month or more. We camped here for the night, and the next morning resumed our march, following the path which took us over the hills, till we came to a large tract of cleared ground land and two villages. From this place we could find no trace of a path going east. The natives insisted that they did not know of any; but I doubted them, and I doubt them still, though I did not find any. There was nothing left for us to do but to get through the forest as best we could; we had no thought of going back. Our course lay east, and the peak of Békulúsi in the distance was a good point to work to. So off we started.

It took us three days to get clear of the forest, until we came out at the villages on the left bank of the Manúnguárivu. It was a terribly difficult and rough piece of travelling, more especially so because our way took us over a mass of hills, all up and down, not a piece of level country anywhere. In some parts we found the ground covered with a kind of rattan-cane, which was most difficult to get over. We crossed several considerable streams as we went along, all trending along to the Manúnguárivu. The scenery is grand in some of the valleys—lofty rocky precipices, a dense forest on either side, the banks of the stream lined with graceful palms and strange ferns, the stream rushing and tumbling over the rocks, making a thousand cascades and bright little waterfalls. After three days we cut our way out of the forest, and after passing through a number of villages and gardens, arrived at the town of an old Betsimisaraka friend, and there camped.

At the back of this town rises the lofty hill of Békulúsi, one of the highest in North Madagascar. According to native report, no European had ascended it till I did so. I took with me three men, and thought I should be able to reach the top by evening; but the way was too rough and the forest too thick for that, and we did not arrive at the summit till late the next morning. The whole mountain is thickly wooded; as we go up the large trees gradually disappear, and palms, pandanus, and new varieties of ferns are seen. On and about the top, the ground and all the bushy vegetation is covered with a light kind of moss; in some places it is quite 18 inches deep. Here there are no large trees, only a few scraggy bushes and heath-like plants.

After finishing my observations we descended again, and reached the camp about noon of the third day. Some few weeks were spent

making various collections, and then we went over the mountains to Ankarámi, and on to Anórontsánga by way of Bézávuna.

I remained some few days in Anórontsánga, and then hired a boat to take me slowly down the coast, my object being to collect as I went along, and then, making Mujangá my head-quarters for a time, to continue my operations in the surrounding country.

After bidding farewell to our friends at Anórontsánga, we went on board, and, taking a south-west course, a good stiff breeze soon brought us under Nósi Úvi, and after passing between Nósi Fáli and Nósi Mbalíha, we took a more southerly course, and touched the coast at Andránumbélu, where there are a number of Sakalava villages. We went ashore, and after a little negotiating were given a house to make use of. Throughout the night there was a great deal of noise—shouting, singing, and dancing. The sister of a Sakalava queen living in an adjoining village was very ill, and a semi-religious ceremony with incantations was being performed for her benefit, in hopes of her recovery. The next morning, after giving a present to the chief man of the village, we resumed our journey down the coast. Early in the day we passed Nósi Sába, and afterwards the villages of Kírakángi and Lúza. Towards evening we had passed Nósi Láva, and arrived safely at Andrúnjina.

This being a Hova settlement, I sent a messenger to report our arrival to the officer in charge, who at once invited us up to the Ruva. After delivering the passes I had from Rakotovau, and the usual preliminaries, the officer made his professions of welcome, gave us a house to use, and shortly afterwards sent on the usual queen's present of food. We stayed here all the next day to look about the country. The Hova officers, too, were glad to have us, for the place is quite off the high-road, and seldom visited by strangers. The district is a dry and barren one—chiefly a reddish loam, elevated some 50 feet or so above the sea.

The next morning we were up early, bid good-bye to our Hova friends, who had been very kind to us in a quiet manner, and set sail across the mouth of Naréndri Bay. A strong wind was blowing, and in two hours we had reached Cape Meromóni, a distance of some 15 miles. Having passed the Point, we proceeded slowly down the coast. Here a soft sandy beach stretches away for several miles, and a belt of fine casuarinas extends all the way just above the high-water line. At night we drew the boat inshore, and camped in a little grove of trees close by. The greater part of the long cape which forms the west side of Naréndri Bay seems to be quite uninhabited. We had not seen a native since we left Andrúnjina. The country is all very dry, sandy, and covered with a bushy vegetation.

As soon as our boat was afloat the next morning we started down the coast again, and in about two hours we reached a great mass of limestone rocks, composed almost entirely of fossils. These extend along the coast for a considerable distance, and the south end forms Cape Mazámba.

The most wonderful feature connected with these rocks, is the manner in which they have been cut up into passages and gullies, by the action of the water. I and two of my men went ashore here to look at the rocks, and then we cut across the country to some Sakalava villages, situated at the head of the Bay of Mazámbu. We waited for the boat to come up, and intended to go on; but, the water being low, we could not get away. We therefore applied to the Sakalava chief, who gave us a house, and we stayed for the night. There are some large tracts of swampy ground at the head of the bay, covered with belts of the rafia palm. This palm is largely used by the natives in the building of their houses, and many constantly employ themselves in peeling the skin from the young green leaves, which they dry, roll up in bundles, and sell to the coast traders. This forms the rafia grass so much used by gardeners.

We started out of the bay the next morning about seven o'clock, and proceeded down the coast towards Mahajámba Bay. In about two hours we arrived at a little rocky bay where a European ship had gone ashore, and was afterwards broken up by the Sakalavas. Some few pieces of her timbers still remained on the beach. Moving slowly along the beach, we came to Ambúngumbé, a kind of makeshift village just under a high cliff. The people were a mixture of Sakalavas and Makuas, who had come from their villages inland to do some fishing. We stayed with them three days; they were very quiet, pleasant people, and gave us guides to take us wherever we wanted to go. The country is an elevated plateau of red sandstone, ending abruptly in a perpendicular cliff near the beach. The plateau is covered with a thin forest, but there are no large trees. The ground is very dry, and apparently very unfertile.

Leaving Ambúngumbé, I intended to go to some of the villages at the head of Mahajámba Bay, and stay for a while; but when we were near the entrance, the "varatraza," or land-breeze, was blowing so strong that we could not enter, so we had to pass on and make the best of our way towards Mujangá. It was as well, perhaps. I was not able to visit these villages, for shortly afterwards they were attacked by "marafela," or robbers, the places looted, several natives killed, and amongst them a French trader. In the evening we anchored off Márasakúa, and the next day, after a long run down the coast, we rounded Cape Ampásimárini, arriving at Mujangá about three o'clock in the afternoon. Here I received a hearty welcome from Mr. Stratton C. Knott, British Vice-Consul at Mujangá, and by his kind help I quickly obtained a house and settled down comfortably for my work.

By Mr. Knott's assistance, I soon got through the usual formalities incident upon a traveller's arrival at a Hova centre. He kindly introduced me to the governor-general, obtained for me the necessary papers and passes required by one travelling about in the district, and

afterwards we went together to a grand dinner given by the governor-general to celebrate the departure of his son for France. Mujangá stands in great contrast to all the Malagasy towns on the west coast. It is the only one that has good stone-built houses, and these give the place quite a substantial-looking appearance. They are all built as near as possible to the beach, and belong chiefly to the Hindi traders. The native houses are built chiefly of palm-leaves, sticks, and rushes. The Hova part of the town is built on some rising ground about half a mile inland; and a short distance away there is an old dilapidated fort. Groves of mango trees, guavas, and mabibu cover the adjacent country, and give a most pleasant shade.

After a few days' stay in Mujangá, I left for a trip inland to Bétsáku, a Hova station some fifteen miles distant. The first stage brought us to Anpárangídu. Here we rested for the night, and the next day, after a march of about ten miles, we reached Bétsáku. The whole of the country is very undulating. There are numerous lakes, which abound with crocodiles and fish; they are also the home of a great variety of ducks and other water-loving birds. Bétsáku is situated on rather rising ground. It is not a large place now, but the surrounding country seems to indicate that when it was held by the free Sakalavas it must have been a very populous district. Here the lakes are much larger than those we passed on the road; they are all surrounded by belts of rafia palm; and crocodiles, fish, and water-birds are present in great numbers.

I went through the usual formalities with the governor in charge as soon as I arrived. He received me very graciously, and placed one of his houses at my disposal. The usual queen's present of food was duly sent in, and this was followed by a friendly interchange of visits between the governor and myself.

I remained collecting in the country for about three weeks, and then returned to Mujangá. The day before leaving Bétsáku, the governor gave me a farewell dinner. After dinner he called up all the women and girls of the place before the front of the house, where they went through a series of song-singing; they were then drilled in groups like soldiers; and after this they performed four or five charades, accompanied by singing and acting. This over, I had to give a present to the governor for them, and they retired.

On reaching Mujangá I shipped my collections home by the mail, and then hired a boat to take me to Antsúha, a place some 30 miles west-south-west of Mujangá. To reach this, we had to go outside Bémbatóka Bay and down the coast past Nósi Makúmba. Towards evening we anchored just inside one of the many inlets hereabout, and next morning proceeded up the river with the tide. We had hoped to reach our destination during the day, but, the water failing us, we did not reach it till noon of the next day. A new village had recently been built on a point of

land nearly surrounded by water. The old place had been deserted because some one had lately died there, it being on that account considered bad. The natives here are of the worst kind of Sakalavas. They have never been conquered by the Horas, and for many generations Mohammedan immigrants from the Comoro islands and Zanzibar have had considerable influence amongst them—so much so, that all their chiefs and many of their people make a kind of profession of Mohammedanism; and they are amongst the leaders of the West Madagascar slave trade. This trade is, or was, very extensively carried on at every place of importance on the coast between Mujangá and Mórondáva; most, perhaps all, of the slaves passing through the hands of these Mohammedan traders from the Comoro islands and Zanzibar. They fetched cargoes of Makuas from East Africa to sell to the Sakalavas, and the Sakalavas selling to the Mohammedans all such other Malagasy people they had taken by war or in any other way.

On account of the slave trade, the Sakalavas along this piece of coast have the greatest objection to Europeans visiting their country, for their Mohammedan friends have not failed to inform them with what aversion white men, generally, look upon the traffic, and of the means which are used to suppress it. This has made the strip of country between Mujangá and Mórondáva almost, if not quite, the most difficult to enter of any in Madagascar, and to this day the whole of the country lying inland from this part of the coast is little or no better known to Europeans than the Máhafáli or Antandrói countries in the south of Madagascar. The chief of Antsúha seemed somewhat friendly when I arrived, and gave me a house to use, but when he found he could not get from me everything he asked for, he began to make himself disagreeable, and put obstacles in the way of my men collecting the things I wanted. I only stayed about a week in the district, and then returned to Mujangá.

My next short journey was to Katsépi, a Sakalava town and district lying on the west side of Bémbatóka Bay, and opposite Mujangá. We went by boat, and arrived in the evening. On landing, a messenger was sent to the queen, who ordered a house to be given us. This was done, and the queen sent word that she would see us on the following day. The next morning I sent my men off collecting, and in the course of the day the queen came. I had to tell her my business, though she had already learnt it; afterwards I gave her a considerable present, and she granted her permission for me to collect whatever I wanted. I spent about a fortnight hunting all over the country. I did not get much in insects, but secured some fine specimens of lemurs.

The country is of mixed formation—that near the coast very undulating, covered here and there with belts and large patches of forest, other parts open and clothed with a coarse grass. Some of the highest spots are crowned with huge Sakalava graves. These are from 50 to 60

feet long, 15 feet wide, and 5 or 6 feet high. They are enlarged from time to time by fresh bodies being buried at the ends, and further accumulations of stones added. The part of the country near Bémbatóka Bay is flat, and composed of a hard kind of limestone. In it there are numerous deep holes and cavities; everywhere the softer parts of the rock have been washed away, leaving only hard rocky points, which are most difficult to walk on. The whole of this part of the country is covered with a thick forest, the home of several species of lemurs, the wild boar, and guinea-fowl. Having finished my collecting here, I returned to Mujangá, where I packed up my collections, and Mr. Knott kindly undertook to ship them home for me.

When I left Mujangá by the French mail, my intention was to land at Máintiránu and collect there for a time, but on the steamer's arrival off that place, there was such a high sea running that it was impossible to land, and I had to go on to Mórondáva. On arrival at Mórondáva I received a most hearty welcome from Mr. W. Donavan, one of the chief traders of the place, who kindly gave me the use of one of the houses in his compound, and assisted me in every way possible.

The place commonly called Mórondáva is really a sandbank named Nósi-miándraki. The village of Mórondáva is situated some two or three miles more south, and was formerly a rather important place, but now Nósi-miándraki takes the lead. It is here the mail-steamer calls, and all the traders have their houses of business. The country round about is a large flat delta formed by the river Mórondáva, which here enters the sea through a number of creeks and streams which cut the delta into several small islands. These are mostly covered with a dense mangrove vegetation, and the whole district is very unhealthy.

After a few days' stay about Mórondáva, I started off to Mahábu, a district some two days inland. I could have gone by water, but I prefer the road to the milanga, a shallow, round-bottomed canoe. The path took us through a long stretch of mangrove swamps, and then we crossed a large marshy plain. Here there is a considerable settlement of free Makuas. It is a pleasure to contrast their clean, tidy homesteads with the dirty hovels and surrounding of the Malagasy. The Hovas especially are the dirtiest in their houses and town of all the Malagasy I have seen. I had met some of these Makuas at the coast, and on arriving at their village they gave me a hearty welcome. They were delighted at my being able to converse with them in Swahili, and more especially when they learnt that I had travelled all about their fatherland, the Makua country, in East Africa. Anything they had I was welcome to. Most of these people are professedly Mohammedans, but some few attend the Norwegian Lutheran Mission Church close by. Passing on from the Makua settlement, we entered a thick forest of rather bushy trees. We traversed this for some distance, and then arrived at a large open space occupied by a Sakalava village. The

natives here keep a good number of cattle, so I wanted to buy some milk. On offering some silver in payment, they refused to take it; it was "fadi," a forbidden thing, for them to use silver. They absolutely refused the silver, but gladly took two or three empty bottles in exchange.

The next part of the journey was through a forest growing in an immense swamp. This is always somewhat muddy, and especially so at spring tides, at which time it becomes covered with salt water. We now arrived at a piece of country which had formerly been covered with a dense forest, but now only belts and patches of it remain; the rest had been cleared away by the natives to make new gardens. The principal feature in the vegetation is some fine Adansonias (baobabs). These are about 10 feet in diameter at the base, and rise up 80 or 100 feet straight, and then send out a small branching top. Sometimes the common baobab, very stout and somewhat short, with large gouty branches, is seen, but the former predominates. Just on the outskirt of the forest we came to a group of villages situated on the left bank of the upper outlet of the Mórondáva river. Crossing to the right bank, we entered upon a large tract of flat bushy country. A little to the left of the path as we went along we saw a number of villages partly hidden by the bush. A few Hovas are settled here, whose duty it is to collect the "isan-pulu" or tax on the produce of the district. The inhabitants are chiefly Sakalavas, with a few Makuas. Proceeding on for about two hours, we came to a wide valley, having a piece of somewhat rising ground stretching along the hollow. On this a large Sakaláva village has been built, and there we took up our abode for the night. We had some difficulty in getting a house at first, and even when we had arranged for one we were not allowed to enter it till we had paid the price demanded. This was a rather strange action on the part of a native; but I suppose some Creole trader or other had lodged here previously, and had gone off without paying his bill, and this time the owner intended to make sure of his money.

We started early the next morning, and after four hours' marching arrived at the village of Bésakúa, and made a halt for breakfast. Whilst this was being prepared I went out and shot some sand-grouse, and on returning found it was "fadi" for the natives to either shoot them or bring them into the village; they did not object to my shooting the birds, but requested me not to bring them into the village. These birds, so the natives said, were made "fadi" because they had saved the village from destruction some time ago. A covey of these birds, being disturbed by an advancing enemy, rose up, with their usual loud cackling which they make whilst flying; the natives, alarmed by this, discovered their enemies approaching, attacked them, and drove them away. Thus the birds saved them from a surprise, and their village, probably, from destruction. Two hours' further travelling, and we

reached the important Hova settlement of Mahábu. This is well enclosed by a thick reketa (Opontia) hedge, which quite hides the buildings of the town from sight. We halted just outside the principal gate, and sent a messenger to announce our arrival to the governor. The men returning, we were told to proceed at once to the Ruva, where we received a warm welcome from the governor Razafindrazaka. I had previously met the governor at the coast, so had no formalities to go through with him. He at once placed a fine house at my service, and offered to do all in his power to assist me in my work. To celebrate my arrival the governor gave a great dinner, to which all the chief officers of the district were invited, and to help me on in my work he placed at my disposal a number of Ampelakalefu, or Taimero men; these are a brave, hardy race of men, who go in parties all over Madagascar in search of work. They suited me well, for they are not afraid to go about the woods as most natives are.

Mahábu town is divided into two parts, but all is enclosed by one huge raketa fence. The Ruva, dwellings of the principal officers, church, and school are fenced off on one side of the enclosure. The other part is occupied by the ordinary Hova inhabitants, and contain nearly two hundred houses. On the Christmas Eve of 1890, I saw the whole of the houses in this part of the town burnt down in about two hours. A Hova, contrary to law, was distilling some rum for the coming festivities; by some means his house caught fire, and the native building-material being of such an inflammable nature, all efforts to put it down were unavailing, and it burnt itself out. The official part of the town was saved by the huge raketa fence which intervened.

Outside Mahábu town the country is all very flat and somewhat low. It is chiefly covered with a thick forest, with an occasional open space. To the north there is a large lake abounding with crocodiles, and a considerable number of ducks and other water-loving birds. There are no towns in the neighbourhood to the north, but at a short distance to the south the river Mórondáva flows past, and this is well populated on both banks. The people are a mixture of Sakalavas and Makuas, who are generally well disposed towards strangers, but they all have no love for the Hovas. I frequently camped about amongst these villages, and the natives always treated me with kindness and respect.

After a few weeks' collecting in the neighbourhood of Mahábu, I started with a party of men to visit the Máshakúru districts lying to the east of the Tsíandávana hills. Shortly after leaving the town, we crossed to the left bank of the Mórondáva, thence on for a few miles through Sakalava gardens and villages, and we crossed to the right bank again. The river is fordable in many places during the dry season, but when full, during the rains, it is very deep, and the rush is so strong that it is most dangerous to attempt to cross, even in a canoe. Passing

along, we came to the ancient burial-place of the Sakalava kings and chiefs. The greatest reverence was shown in passing these tombs, and all, even the Hovas, took off their hats as a mark of respect. The graves are the usual large square piles of stones, only those of the royal family are much larger and better built. At Mórondáva the coast Sakalavas do not bury their dead under heaps of stones, but in the sand, and then build a palisade round the grave with posts, rails, and palings. The top rail is carved with figures of oxen, canoes, crocodiles, and other figures; the posts are generally ornamented with figures of men, women, birds, and water-pots. The road now took us over some rough undulating country, watered by several small streams, and thinly wooded. Towards evening we reached a group of Sakalava villages, and camped for the night.

Next morning we resumed our march, and a two hours' brisk walk over a flat bushy country brought us to the little river Tsesí, flowing at the foot of the Tsíandávana hills. After a short rest we had a stiff climb to reach the top of the hill, where there is a wide plateau. This is covered with a short grass, and is almost devoid of trees. The largest tree we saw was a tamarind standing on the edge of a small pond. Close by here the road branches off, one part going north-east to Málimbándi, the other east to Bérunúnu. We followed the latter, and soon saw a change in the appearance of the rocks; they gave one the idea that there had been an immense fire, and all the stones had been melted up into masses of blacksmith's hards, or slag. Now we began to descend, and, following a tortuous path about the hillsides, arrived at a fair-sized stream flowing in a deep gully. Two miles down this stream brought us near to the Bérunúnu villages. We halted and sent messengers to inform the chief of our arrival. After waiting some time, the men returned with orders for us to proceed to the village. Here we were met by the chief and his people, to whom we explained the reason of our presence among them. When the usual formalities were ended, the chief gave me two good houses for my use, and then sent in a big present of food—a goose, fowls, ducks, rice, and eggs, and a promise of as much milk night and morning as I liked to use. We were soon comfortably settled, and then I visited the chief in his own house, and, after explaining to him more fully what I wanted to do, thanked him for the very friendly reception he had given us; and he then informed me that the country was open for me to go where I pleased, and that he would give me men whenever I wanted them to guide me about. This was exceedingly kind of the old chief, and the best of it was he kept his promise to me.

I remained some two months in this district, and here shot my first fusa (*Cryptoprœta ferox*). He was curled up on a big branch of a tall tree. I thought it was a large kind of lemur; a charge of buckshot brought it down, and I was agreeably surprised to find it was the animal

I had been so long looking for. I had seen one previously at the foot of Békulúsi hill, but, being without a gun, was unable to get it.

I remained in the neighbourhood of the villages for the first few days, and then went and camped about the forest, the old chief every now and then sending me fowls, rice, and other food from the village. He also gave me two oxen to be killed for the men who were with me. These did not cost him anything, for he was really the chief of a band of marafela, or cattle-stealers. Whilst I was there the men brought in three large herds which they had stolen from some villages at a distance. The hillsides are covered with a thick forest, and are alive with lemurs, fusas, wild boar, and many other animals. The valleys are low and swampy. There are many good-sized lakes, which abound with ducks, geese, and other wild-fowl. Across the large valley a piece of slightly rising ground forms a kind of watershed; the water on the south drains into the Mórondáva river, that on the north enters the Tsiandúa—a considerable stream which flows into the Tsíribihína—and thence into the sea at Tsimánandrafúzana.

When I had finished my work of collecting, I returned to the coast by way of Mahábu, taking two men with me from the old chief who had been so kind to me. These I sent back again with presents to the chief, that he might see that I had not forgotten him nor the kind manner in which he had received me.

Soon after my return to Mórondáva from my expedition to the Máshakúru at Bérunúnu, the little French steamer *Mpangaka* arrived, on her way to Nósi-vé. My collection inland had been packed up and handed over to Mr. Donavan, to be shipped home by the next mail. The men who had accompanied me thus far, being frightened by the wonderful stories they had heard of the Sakalavas and Mahafalis in the south, declined to go any further, so I had to discharge them; only one man, a Hova, Rabe by name, ventured to go on. With him I embarked on board the steamer, and, after a fair run of twenty-four hours, arrived at Nósi-vé. This is a small sandbank, nearly a mile long and about a quarter of a mile at its greatest width, surrounded by an extensive coral reef. It is situated about 3 miles off the Mahafali coast, in about lat. 23° 40′ S. It was uninhabited some forty years ago, but at that time the Sakalavas and Mahafalis became so extortionate and troublesome to the traders, that they all retired to this island, and made it their head-quarters. Now it is nearly covered with traders' houses and stores, and has become the principal trading-place on the south-west coast. The traders are English, French, French Creoles from Mauritius and Bourbon, and Hindis from Zanzibar and Bombay. The native population is made up of a mixture of Sakalavas, Mahafalis, Hovas, Antinosi, some few Makuas and Betsimisarakas. The French have established a Vice-Presidency here.

On arrival at Nósi-vé I went at once to Mr. Oman, a well-known

merchant, and was received by him in the most hospitable manner. I stayed in Nósi-vé for about a month, and then went over to Salári, a small Mahafali village on the lowland, near the mouth of the Ong'ulahi river. Here Messrs. Proctor Brothers, of London, have a station, and Mr. Hooper, their agent, kindly invited me to take up my quarters with him. My chief object in coming to this part of south Madagascar was to penetrate, if possible, into the Mahafali country, and for this purpose I remained for several months about Salári and its neighbourhood. I made several attempts to get inland, but was always baffled by the natives, who have the greatest objection to Europeans entering their country. Finding my efforts in this direction were so far unsuccessful, I resolved to go away for a time and explore and collect along the coast north of St. Augustine's Bay. For this work I bought a good-sized lakam-piara (outrigger canoe), and hired a sailing-boat of about three tons, and with these visited and collected in all the chief places between Lámbuhára, lat. 22° S., to St. Augustine's Bay.

The most northern part I explored in this manner was Murder Bay. This is an extensive inlet, bounded by wide mangrove swamps. On the north side of the bay the swamp is cut up into a number of islands by creeks which traverse it in all directions. There are several Sakalava villages on the north side of the bay, and on the bank of one of the creeks the trading station of Lámbuhára is built. The traders are chiefly Creoles and Hindis. The Hovas have no authority in this part of the country, nor any, in fact, in all the districts lying between lat. 21° 30′ S., a little south of Mérondáva, and Tuliá in St. Augustine's Bay. The whole country is purely Sakalava, and ruled by Sakalava kings. These are somewhat despotic in their manner, as their actions sometimes show.

On the south side of Murder Bay, three or four groups of houses form the village of Itampúlu-bé. It is built close to the coast, on a flat limestone formation. All the country round about is of the same formation. In it there are some basin-like depressions, now silted up. The upper stratum is a soft black soil, and underneath there is a thick layer of white or greyish loam, full of fossils. Here I procured some of my finest specimens—remains of æpyornis, hippopotamus, bos, potamochærus, crocodile, and various other mammals and birds.

The country inland is a vast flat, very fertile, extending inland to the range of hills, which stretch in an almost straight line from this place to St. Augustine's Bay. There are a number of lakes about the flat, one very large not far from the king's town. There are but few natives living on the coast in this part of the country, most of the Sakalavas here being Máshakúru. The southern Sakalavas are divided into two sections rather than tribes. Those on the coast are chiefly Vezu, whose principal employment is fishing and boat-sailing, though they do some amount of gardening, and keep good herds of cattle. The other section are called Máshakúru. They are essentially herdsmen

and agriculturists. The Vezu despise the Máshakúru because they are countrymen or bushmen; the fiercer Máshakúru look with contempt upon the Vezu because, though noisy, they are cowards.

Nearly all communications between places on the coast are performed by boat or canoe. A reef extends along the coast at a distance varying from half a mile to three miles, and this, breaking the heavy seas, make it perfectly easy and safe travelling. There are several openings in the reef, by which larger vessels can enter either for safety, or to bring up at the villages along the coast.

Leaving Murder Bay, we rounded Isípuki point, passed Vúhits-ábu or Talá, down past Famátaléfu or Mándi, thence to Ambátumilú and on to Mámiránu. Most of these places were inhabited formerly, but now it is quite deserted. The coast-line is generally a succession of sandhills, but here and there sandstone rocks crop out, and these are frequently covered with a limestone, coral formation, or perhaps it is a kind of fossilized wood. I brought some specimens of this rock home for examination.

Leaving Mámiránu, we passed Ándravúnji and Salári. Near this place there is a large opening in the reef, named Kazu-bé-vuhitsi, through which a ship of a hundred tons or more can enter. Thence we went on to Ambátumifúku (the place where the water makes a noise in the holes of the rocks). A most interesting line of sandstone rocks extends along the coast. In making an examination, I found they contained quite a number of land-shells very similar to species still found alive in the locality; but what surprised me more was to find pieces of the broken egg-shell of the æpyornis embedded in the rock. This circumstance alone is proof of the vast antiquity of the bird. The tops of these rocks are covered with either a coral formation, or what I think may be fossilized wood.

This line of rocks, besides stretching along the coast for some distance, extends inland for two miles or more, and on the side facing inland there are extensive waterworn caverns, in which I was fortunate enough to discover, at different times, several fossil carapaces of gigantic tortoise (*Testudo grandidiere*). Two of these are now in the Geological Gallery of the British Museum, South Kensington, and one or more in the museum of the Honourable W. Rothschild, at Tring. From the reports given me, I believe there are many other caves and places in the neighbourhood still worthy of being examined.

From Ambátumifúku we proceeded south, and passed quite a number of places previously occupied by villages, but now deserted—Tampúlu, Tsíandámba, Isaléka, Isífuta, Ampásiláva, Ankílimihúaki, and Fihiérng'amasai. This latter place, as we went up, was inhabited, and apparently in perfect safety; when we returned we found it quite deserted—the people had been frightened away by reports of Rungavuli. Thence we went on to Melíkuki, a dangerous rocky point stretching out some

distance into the sea. On this point, the "lulu," or huge stone graves of some of the chief families of Manúmbu, are built. A short distance further on and we came to Manúmbu. This is the largest Sakalava town on the west coast of Madagascar, and contains, probably, between three and four thousand inhabitants. It is divided into two parts by the river Máhanúmbu. Manúmbu proper is built along the sea-coast on the right bank of the river; the other part, Fitsítiki, along the coast-line on the left bank. It is inhabited chiefly by Sakalavas, and a few Makuas; to these must be added a few European, Creole, and Hindi traders. The king of the place, and all the surrounding country as far as the river Ong'uláhi, is Tumpumana—now a fairly quiet man, but formerly a terror to all traders and strangers in the country.

I had occasion to visit the king some three or four times. All foreign strangers when visiting the king are supposed to shake hands with him, instead of grovelling before him as the natives do; but he makes them pay for this concession by demanding that every white man shaking hands with him for the first time shall at the same time leave a piece of gold in his hands. The various towns and villages are ruled by the local "masondranu," or chiefs. Those of Manúmbu are Tsialala, Saruveta, and Mahiti. They try all the cases which arise between natives, or natives and strangers; but they are not allowed to do it all their own way. All the freemen of the place have a word in the matter, and if it cannot be settled satisfactorily, then an appeal is made to the king.

From Manúmbu we went on to Ambúlisátra, passing on our way Úrantámbu, Kúafasi, Andrévuki, Fanandúmutsi, Itúnga-bé, and Béfutúa. The only inhabited place is Andrévuki, a small but rising town. There is not a town really at Ambúlisátra, only a few little huts occupied by some herdsmen who here attend to the king's cattle. There are several herds, some belonging to kings, or rather named after kings of generations back. All these are kept separate from the present king's cattle, and supply the necessary victims for the royal sacrifices.

The district of Ambúlisátra is important, for here has been discovered some of the most remarkable fossils of Madagascar. M. Grandidier, several years ago, made some of his finest discoveries here. I made several visits to the place, and was equally fortunate, especially in finding the head of the *Megaladapis Madagascariensis*, a gigantic fossil form of lemuroid. This has been described in *Philosophical Transactions* of the Royal Society by Dr. C. J. Forsyth Major. This is a remarkable piece of flat country, and has, undoubtedly, at some remote date, been occupied by an extensive lake, of which only pond-like depressions remain. I believe there are neither fish nor crocodiles in these small lakes, but I have frequently seen some hundreds of the scarlet flamingo (*Phœnicopterus erythreus*) congregated there.

Passing on from Ambúlisátra, we sailed for several miles along a

piece of coast well wooded and somewhat rocky. At one time it had its towns and people, but now only the names remain. These are Antévaména, Máraházu, Fáti, Berávi, Lúhatáng'a. A considerable lake inland is named Ránu-bé (Big-water), and a village near by takes the same name.

From Lúhatáng'a a long stretch of sandbanks extend to Fihireng'a, or Tuliá. On these banks there are a number of small villages—Belítsaki, Bélalánda, Ambúliránu, Ambaráta, and others—inhabited chiefly by Vezu-Sakalavas, who are somewhat under the control of the Hovas at Tuliá, but ever ready to take to their canoes and decamp should they feel the Hova authority bearing too heavily upon them. Fihireng'a—or Tuliá, as it is often called—is the chief Hova station in South-West Madagascar, the head-quarters of the few little stations round about. From this place to near Fort Dauphin, on the south-east coast, the country is entirely in the hands of the natives, nor would the Hovas dare to go into the country. Even here about Tuliá the Hovas have no established authority over the natives, who look up to Tumpumana as their only king and ruler. The principal business of the Hovas is, apparently, to collect the isan-pulu or custom duties, and they do not seem to do anything else. Certainly they do nothing for the Sakalava natives, for they neither restrain them in their tribal wars and disputes, and protect them from the raids of robbers, who carry off both their cattle and people, nor have they established any schools or used other means to elevate them in any way.

The town of Tuliá is built on a long sandbank running parallel to the beach, and is a somewhat important trading centre still. But previous to the arrival of the Hovas it was the chief town on the coast; now Manúmbu takes the lead in numbers. At the back of Tuliá there is a large tract of flat country, very fertile, formerly cultivated by the Sakalavas, but now abandoned.

So much has been written concerning the Hovas, and so little about the other tribes, that there is a general impression that the Hovas have established themselves all over the island. This, however, is quite a mistake; probably not half the natives of Madagascar recognize the Hovas as their rulers and Ranavalona as their queen. A straight line might be drawn from Mujangá on the west coast to Fort Dauphin on the south-east; there are but few real subjects of Queen Ranavalona west and south of that line. Most of the minor tribes in the south-east are as free as ever they were, and much the same may be said of the Antankaranas in the north.

The burial-place of the southern Sakalava kings is situated a few miles inland from Tuliá. This is enclosed and constantly guarded by a certain family of Sakalavas. No one is allowed to enter except at royal funerals or on certain appointed occasions. In a piece of water not far from this place there are a number of crocodiles which are

considered sacred, and no one is allowed to kill any of them. They are preserved for the sake of their teeth. When a king dies, a crocodile is caught alive, one of its large teeth extracted, and then it is set free again. The hollow tooth of the crocodile is required as a receptacle for "gini" of the late king; that is, a tooth, finger-nails, and other parts which are held to be sacred, and must therefore be preserved.

After returning to Nósi-vé from Ampaláza, I went on several short collecting trips to Manúmbu, Tuliá, and other places on the Sakalava coast.

When I arrived again in Nósi-vé after these trips, I learnt from Mr. Oman that Befanatriki, an Antinosi king from the interior, was coming to the coast. Mr. Oman, as well as myself, wanted to go inland, and thinking that probably the king would allow us to go up with him when he returned, as soon as we heard of his arrival at Anatsúng'u, a town at the mouth of the Ong'ulahi river, we went over to see him. He received us very kindly, and not only readily fell in with our wishes, but also agreed to supply us with all the porters we needed for our baggage.

On the third day the king gave the order to start. We were a party of about eighty, all told; the king remained behind with his wife and a few men, saying he would come on shortly. Our path took us through the gardens on the strip of low ground on the right bank of the Ong'ulahi. The first day's journey was a long and tiring one, partly over sand, sometimes in the river, and in other places carefully picking our way along the steep and rocky spurs of the hill, which here slopes down into the deep channel of the river.

We passed several villages as we went along, the most important being Ifenuarívu, the residence of Ramara, an influential Sakalava chief.

Towards evening we entered the district of Ilánza, held by an independent Sakalava chief named Tsilivani. Next evening Befanatriki came up with his household and the rest of the men, and the next morning we resumed our march. This took us by a tortuous path up the hillside till we reached the plateau above. Here the path took a north-north-east direction. At night we encamped in the thick forest near the path. The Malagasy never like to camp in the open, nor yet keep up fires at night. The whole of this district is an elevated sandstone mass, overlaid with a stratum of limestone full of shells. The country is covered with a thick forest, with here and there open glades clothed with a coarse grass.

The next morning we resumed our journey, and passed over a more undulating country, and finally came out on a broad open plain. This is but lightly wooded, excepting a few belts of forest here and there. A number of lakes are dotted about the plain, but during the dry season they become nearly dried up. About the middle of the afternoon we had crossed the plain, and arrived at the edge of the plateau, from which we could look down into the valley which extends to the Ong'ulahi, some 10 miles away.

After a few days' further march we reached the large village of Ilúnti, and crossed to the left bank of the Amantaki. We then went on in an easterly direction over some undulating ground till we reached the Isakamaré, and crossed over to the left bank; thence our course was almost due north. We had now reached the northern end of the Bekuráki range. Going on, we found the hills on the right bank of the Isakamaré, a continuous unbroken range. Those on the left bank form a group most extraordinary in conformation and appearance. They rise to a height of about 1500 feet; the sides, which are very precipitous, and in some places quite perpendicular, enclose narrow valleys, coursed by small rivulets which flow into the Isakamaré. The scenery is of the most varied composition. In one place the towering rocky masses induce a feeling of awe and grandeur; a little further on, another reach of the smooth-flowing river, with its banks graced with beautiful hanging ferns and stately palms, presents a scene of quiet and repose. After advancing up the river between the hills for some 4 miles or more, we came to the village of Ambatulúaki (at the hole in the rock), and rested. This is the most northern part of King Befanatriki's country.

After a brief stay we commenced our return journey down the Isakamaré. The most remarkable feature about the whole country we had traversed was a number of bogs or old lake beds we came across; not only were they common all over the open country, but even in the little valleys between the mountains on the Isakamare we found them. It seems as if the lakes are a very old formation; that the sandstone hills, which are really only part of a large plateau which covered all the country about, are of later date. This plateau has now been washed away in many places, and the old lakes are brought to light again. There is no forest about the country; the nearest piece of real forest is Ambúliála, situated some 15 miles north of Manansúa. The country generally is not very fertile; but all the damp places, bogs, and marshy places are especially good, the natives every year being able to raise two crops of rice upon the same piece of land. The cultivation of rice forms the chief occupation of the Antinosi; large quantities are raised and conveyed by "laka" to the coast, and then sold to the Sakalavas. All the chiefs and many of the people keep large herds of cattle—not that they deal much in them, but they are rather a mark of the owner's wealth and position.

Shortly after this Mr. Oman returned to the coast, but I remained at Manansúa to continue my work of collecting. This I continued for some nine months, making short trips and camping about the country in all directions. Whilst engaged in collecting insects, birds, and other natural history objects, I also engaged some men to excavate among the dry lake beds at Ilúnti and Ifúnsi, with the result that I found at both places a number of broken carapaces of a gigantic

tortoise and of some smaller species. Amongst these fossils there were also fossilized remains of the æpyornis, hippopotamus, crocodile, and other animals.

One of the longest journeys I made during this period was done in company with Befanatriki, who went on a visit to his friend Lahmanzaka at Béfamáta, on Laki Ihúti.

I now began to make preparations for returning to the coast, and I was very eager to perform the journey by canoe down the river. This was at last arranged in company with Befanatriki, his wife, and a considerable retinue. Our first reach down the Ong'ulahi river was in almost a south-west direction, between a lot of sandbanks. All the right bank is very low, the other side somewhat higher and bushy. The next morning brought us at an early hour to the mouth of the Isákamadíu, a considerable affluent of the Ong'ulahi. Here the country is much more hilly, rough, covered with rocks having the appearance of volcanic origin, and all is covered with a somewhat dense forest. Further inland, where the country is higher, there is no forest, but the country is clothed with a coarse grass.

Leaving Andávakakíu (at the shark's hole), the stream carried us along in a somewhat north-west direction for about 3 miles, and then we arrived at the important town of Sálu-aváratsi. Here we remained for three or four days. King Befanatriki, who is nephew of the king of this place, had some business which detained him. This place is the eastern limit of a curious geological formation, abounding with hot-water springs. The line of country occupied by these springs lies in a south-west course, and extend from Sálu-aváratsi in the east to Andránumái on the left bank of the Ong'ulahi in the west, and is some 10 miles wide. The hot spring of Sálu-aváratsi is just outside the village gates, where the water rises out of a great bed of limestone. It is used by the natives for all purposes. The steam from the rising water gives off a rather unpleasant odour, but this passes away as the water cools down.

From Ambúruki we went on to the villages of Béfamáta. Close by these villages there is a large lake, some 2 miles in diameter. It abounds with fish, crocodiles, and birds. It is said that formerly there was an extensive morass here, and the Sakalavas, living in a village on the top of Ivúhi-bé, used to have their rice-gardens all over the place. Suddenly, however, there was a depression, and the place was flooded with water from the Ong'ulahi. There are none of the inhabitants now living who remember the change taking place.

Resuming our voyage down the river, we passed the mouth of the Tahéza, the most important tributary of the Ong'ulahi, on its right bank. Further on we came to the village of Behísatri, a place geologically interesting. The village is built on a sandstone hill. The hill is, I suppose, part of the old sandstone plateau which formerly covered the whole of the country. The channel of the Ong'ulahi, sweeping

under the foot of the hill, has washed it away so as to form perpendicular cliffs. Here one gets a fine section of the strata, which are as follows: a thin layer of blackish soil, recent vegetable *débris*, followed by several strata of variously coloured sandstone to within 4 feet of the water. The next stratum is a hard greenish-black mud which descends below the water's edge. This lower stratum I take to be the bed of some lake of a very old formation.

In the district of Bevítiki we reached the high plateau which occurs on both sides of the river, and which extends to the coast. The upper part or stratum of this plateau is formed of a fossiliferous limestone, then a thick mass of red sandstone resting on the stratum of a hard black stone, or rather various-shaped lumps of hard black stone, with the interstices filled up with a kind of limestone. The general height of the plateau is from 1500 to 2000 feet. It is covered everywhere with a thin forest, formed chiefly of different species of Euphorbia.

There is nothing of interest to note during the rest of the journey.

THE U.S. GEOLOGICAL SURVEY.

By MARCUS BAKER.

THE year 1894 marks an epoch in the history of the U.S. Geological Survey. Major J. W. Powell, its efficient director almost from the beginning in 1879, resigned his office in May, 1894, and was succeeded by Mr. Charles Doolittle Walcott. This event, therefore, makes 1894 a transition year; a year which may be said to close an old and begin a new chapter.

It will be remembered that the Survey was created March 3, 1879, by a consolidation and reorganization of three pre-existing surveys, known respectively as the Hayden, Wheeler, and Powell Surveys. Mr. Clarence King, the first director, resigned his office so soon after entering upon it, that the present development and organization of the survey is chiefly due to Major Powell, who directed its course and work for thirteen years, 1881–1894.

In noting the transition from the old to the new *régime*, a word or two respecting the two directors may not be out of place.

Major Powell is a striking personality, whose sturdy and independent thinking and acting has strongly impressed, and still impresses, all who come within reach of his voice or pen. The present Survey is in large part his creation. Under his guidance, it began on a moderate scale and grew rapidly. The confidence and support of Congress was won, and an increasing number of enthusiastic co-labourers brought into the work. The buoyancy of youth and hope pervaded the organization. Affection for the leader and confidence in him was unqualified. The annual budgets steadily increased, and all was bustling activity. In

1888 Congress created an irrigation survey within the Geological Survey, and made generous appropriation therefor. But antagonism in the western part of the country soon arose, resulting from titles to land affected by the new law. Accordingly in 1890 the irrigation survey, after a short life of two years, was abolished by withholding appropriations, and the Geological Survey was much reduced. Many discharges were necessitated, and reorganization resulted. So reduced and reorganized, it continued till May, 1894, when Director Powell surrendered the leadership to his younger successor, Mr. Walcott.

Major Powell lost his right arm at Shiloh in 1862, and the stump has been a source of unceasing and increasing pain for years. On surrendering the directorship he went at once to Johns Hopkins hospital, in Baltimore, and underwent a successful surgical operation, setting him free from pain. Thus physical pain and administrative care vanished together, and now, pain-free and care-free, he is conducting the Bureau of Ethnology, and pursuing his philosophical studies and writings.

Mr. Wolcott was a member of the Survey, and had been for fifteen years when he was promoted from chief geologist to director. The successor to a great leader finds much expected of him. Unless he be a strong man, and especially if he be a young man, unfavourable contrasts are liable to be pointed out. That they have not been in this case is proof of the wisdom of the choice. Mr. Walcott assumed formal conduct of the Survey's affairs on July 1, 1894.

In the United States the calendar and fiscal years are not identical. Reports of progress by the various bureaus and departments of the government are usually for the fiscal year beginning July 1, and ending June 30. The last report issued under the direction of Major Powell is known as the 'Fifteenth Annual Report,' and covers the period July 1, 1893, to June 30, 1894. This report, now stereotyped and about to go to press, is in one sense a farewell volume, and summarizes the Survey's work down to midsummer, 1894.

The facts and figures in that report all set out in due order, and, in the stiff, official form usual in government publications, exhibit the Survey's progress and results. But the interesting background of motive and men, of hopes cherished or plans conceived but never executed, of the inner life of the organization, its *esprit de corps* or the want of it,—these and many other things do not appear in it. Indeed, such facts hardly get published at all, except as scraps more or less coloured by the unknown author's conscious or unconscious bias. Only at the club or social dinner is one permitted to get any near or clear view of the inner life or of the undercurrent of governmental workings.

From thirteen years' continuous work by the U.S. Geological Survey have resulted 900 topographical maps and 120 books. Let us amplify this curt and bold statement, and especially let us explain the absence of geological maps. That a Geological Survey should be steadily engaged

for more than a decade with a large corps of workers and generous grants of money without producing more than a dozen or two geological maps is anomalous, and needs explanation. Imagine, then, a country nearly as large as all Europe, with a population nearly equalling that of Great Britain and France combined. Imagine this country to constitute a single nation, speaking one tongue, and federated together as one unit subject to one single control. And further imagine that nation to be a young member in the group of nations, with great resources imperfectly known. Its chief business, from the nature of the situation, is neither art, nor literature, nor pleasure, but, if I may say so, it is *business*. Its chief occupation consists in the business of developing its resources, making available its stores of metals, of water, and of minerals. To do this it builds railroads, not by single miles, but by hundreds, nay, thousands of miles per year. It builds cities; it develops and utilizes its water-supply, for power, for irrigation, and for commerce. It fells its forests for their timber, and utilizes the cleared land for agriculture. There is so much room, so much freedom, such abundance of resource that the need of economy is neither felt nor practised. So widely do the conditions prevailing in such a new and undeveloped country differ from those established in old countries, that the denizen of the old land visiting the new has the greatest difficulty in understanding what he sees. The difficulty is in the pre-conceived notions he carries with him on his travels. The patriotic American who goes abroad is not less ready to misunderstand what he sees differently done from that to which he is accustomed.

Imagine now this whirlwind of unorganized development of resources to have gone on for a few decades, when the need of improvement in method begins to be felt. Under such an impulse, a Geological Survey is born, and enters upon the work of investigating the mineral resources of the nation and the production of a geological map of its territory. For initiating this work Mr. Clarence King was chosen, but after two years voluntarily resigned the task, which then fell into the hands of Major Powell. Powell entered upon the work with a zeal and energy that were contagious. Full of great thoughts and plans, ripe with varied experience in peace and war, sympathetic, enthusiastic, he inspired all within his influence to high hopes and aspirations, and, more than all, comprehended with great fulness and clearness the problems set before the Survey. His plans were far-reaching, and, his critics said, ambitious.

To make a geological map, he said, two preliminaries are requisite—*first*, a topographical map; and, *second*, such general knowledge of the rock formations to be mapped as will admit a classification adapted to the whole field. If the field to be geologically mapped is small, let us make a hasty or preliminary examination with a view to determining our classification, and, this accomplished, we will then proceed to make our

geological map conformable to this classification. This is the course to be followed in a small field. If the field is large, we must still do the same, though the task be rendered more laborious by reason of its size, and increasingly difficult on account of its complexity. This principle, when applied to half a continent, involves extraordinary difficulty. The variety of rocks and conditions are so great, that to devise a system uniformly applicable was believed by some geologists to be impracticable, if not impossible. Many said it could not be done. Some still say so. Yet it has been done, and it remains to be seen whether the adopted system will or will not ultimately break down. The work of actually mapping out the geological formations was therefore, for a number of years, not entered upon. The energies of the geologists were wholly given to a study of various great problems relating to classification. Dissimilar conditions in areas far apart were made subjects of special inquiry, and from comparison of results, from frequent and friendly conference and discussion, by degrees a system of classifying all the rock masses in the United States was evolved and adopted. A colour scheme for showing results was then elaborated, and thus at last, after years of patient preliminary work, actual field-work in the mapping of areal distribution was possible. And this is why, at the date of this writing (May 1, 1895), the Geological Survey of the United States has actually published but *twelve* of the geological atlas sheets of the geological map of the United States, authorized by Congress in 1879, a map which must ultimately consist of many hundreds, or even thousands, of sheets. We will shortly give a brief description of the character of these published geologic atlas sheets.

The other want to be filled before a geological map was possible was a topographical map. But no topographical map existed. How slow, laborious, and costly a work it is to make a topographical map need not be told to an English audience. For is not its Ordnance Survey more than a century old, with its work still unfinished? It is true that the U.S. Coast Survey had for fifty years been at work upon the coasts, charting the tidal waters, from their remotest inland points outward to the sea, and seaward to the abyss. With this hydrographical work it had joined a detailed and accurate survey of a fringe of topography along shore—a fringe from half a mile to a mile or two in width. The U.S. Lake Survey had done similar work on the Great Lakes, and surveyed a narrow border of land along the lake margins. Along the lower Mississippi, the Mississippi River Commission had done similar work. But all the maps thus produced together constituted hardly a "drop in the bucket," hardly more than one per cent. of the area of the United States. And yet the Geological Survey could not go on without maps. Accordingly its director set about the task of securing them. In the Geological Survey in its earliest days was a small body of trained men, who for a decade had been engaged in the Far West in making maps—topographical

maps, their makers called them; reconnoissances, their critics disparagingly, sometimes sneeringly, called them. The maps produced by these men working in the Hayden, Wheeler, and Powell Surveys were sketches on small scales of extensive tracts of, for the most part, uninhabited country, the sketches being controlled by a triangulation with small instruments. The scale of these maps was, for the most part, either 8 miles to 1 inch or 4 miles to 1 inch. After studying the problem, it was concluded that the rude methods developed in the West could be refined and improved, and made applicable to a somewhat larger scale and more accurate map; and, based upon the experience gained, it was estimated that a map of the entire country, on a scale of in part 4 miles to 1 inch, and in part 2 miles to 1 inch, sufficiently detailed and accurate for geologic purposes and for all general purposes, could be produced at a cost of about £3,000,000, or about one pound per square mile. This estimate, and the reasons for it, were submitted to Congress, approved, and the work authorized. Thus in 1882 the actual work of mapping the United States on a comprehensive plan was authorized and begun. And it was begun and has been carried on by the U.S. Geological Survey, which is thus in fact, though not in official name, the U.S. Topographical and Geological Survey.

For a number of years, then, after 1882, the energies of the survey were given (*a*) to the production of topographical maps, and (*b*) to the study of such geological problems as would develop a system of rock-classification adapted to the whole country, and thus pave the way for geologic mapping. So large was the field, so complex and difficult the problems presented, and so great the labour, that despite a large number of workers, and despite generous grants of money, more than a decade has been spent in excavating and laying the foundation for a geological map of the United States.

As Major Powell retires from the management of this great task, greatly planned, the first walls of the structure begin to rise. Under Mr. Walcott's direction, the final geological sheets are beginning to appear. At this writing twelve have been issued, and it is hoped that the number may be increased to twenty by July 1, 1895. These sheets, by Mr. Walcott's direction, appear as issuing under the directorship of Major Powell.

And here let me describe one of these geological sheets, or folios, as they are called. Even the best description must needs be but a poor substitute for a personal examination of the folio itself. If this description shall quicken the interest of any reader to seek and find in the map-room of the Royal Geographical Society, or in some public library a copy which he may examine for himself, the author will feel that this description has served a useful purpose.

A geological folio, then, of the U.S. Geological Survey is a large thin atlas, 19 by 22 inches in size, bound in heavy manilla paper. On

its cover it bears the imprint, "Department of the Interior, U.S. Geological Survey," followed by the name of the director, and then the words, "Geological Atlas of the United States." The name of the sheet follows, such as Jackson folio, California or Livingston folio, Montana, etc., the sheet being named after some prominent or characteristic feature shown upon it. The sheet is projected without regard to political divisions, and is upon a scale of either 1 : 250,000 or about 4 miles to 1 inch, or 1 : 125,000 or about 2 miles to 1 inch. In the former case it covers one "square degree," or about 3600 geographical square miles; in the latter it covers one-quarter of a square degree, or about 900 square miles. In the "square-degree sheets" the integral parallels and meridians constitute the boundaries. After the name of the sheet comes a skeleton map, called an "Index Map," of a considerable tract of country, within which lies the sheet in this folio, and a shaded area on this index map shows the location of the sheet. A table of contents follows, called "List of Sheets," usually seven or eight in number. The usual imprint completes the page. Printed on the inside of each cover is a simple explanatory text giving the leading facts about the geological map of the United States, of which this folio constitutes one sheet. Its purpose is to describe, in the simplest manner, the great facts about the map, its plan and purpose. "Explanation" is its heading or title, but "Kindergarten Text" is its nickname. The Kindergarten Text is followed by a general description of the geography, geology, and mineral resources of the sheet, entitled "Description of the —— Sheet." This description usually falls under three heads: (*a*) geography; (*b*) geology; and (*c*) soils. The character of this description of necessity varies to fit to various conditions. Some portions of it are applicable to a wide extent of country, other parts relate more specifically to the particular sheet. As the subject treated is somewhat technical, the use of technical words cannot be wholly avoided, but an attempt is made to render the description as simple, clear, methodical, and untechnical as possible. It is intended for the public rather than for the specialist, and the descriptions are accordingly prepared for the public. These folios might, therefore, well serve as text-books in the schools of the regions covered by the folio. The explanatory text appears in every folio, while the descriptive text is specially prepared for each folio. The maps then follow. First, there is a topographical map of the area under consideration, usually on a scale of 1 : 125,000 or about 2 miles to 1 inch, and covering one-half a degree of latitude by one-half a degree of longitude, or one-quarter of a "square degree." This embraces about 900 square miles. This map, engraved upon copper and printed from stone, appears in three colours. The projections, legends, names, roads, towns, etc., in short, all culture, is in black, all water bodies in blue, and all hill features in brown. The hill forms and heights are shown by contours, with an interval ranging from 20 to 100 feet. After this topographical

or base map, follows a sheet from the same copper plate, over-printed with geological legend, colours, and patterns. This is entitled "Areal Geology," and by the usual conventions it exhibits the surface distribution of the various rock masses. The legend explains the symbols used, and gives the adopted classification and geological ages to which the groups are referred. A second geological map of the same area follows, entitled "Economic Geology." This differs from the preceding chiefly in printing. Those rock masses already known to be of economic importance from their yield of iron, coal, gold, or other metal, etc., are printed in stronger colours, while the remaining masses, not now known to yield products of economic importance, are printed in subdued colours. This sheet, therefore, quickly and easily exhibits the coal-fields, the iron districts, the gold and silver belts and spots, etc. A third geological map is entitled "Structure Sections." This may be said to exhibit the under geology. The two preceding maps dealt with the surface only. This one takes us down into the skin or rind of our planet to the depth of half a mile, more or less, and shows us what the geologists believe they have found out about its structure. Imagine a trench half a mile or more deep, with vertical walls, traversing England. Take an imaginary walk along this imaginary trench, and study the bedding of the rocks and soils as seen in its walls. The different kinds of rocks can, in our mind's eye, be seen, and their relations to one another, their sequence, their position—whether level, or inclined, or dipping—and their faults, if they have any.

The third map in our folio aims to show the facts which could be seen in such an imaginary trench. A section or several sections have been measured across each sheet, and the section edges, if I may say so, have been turned toward us in their proper places on the map in such wise that we may see the underground structure.

The last leaf of our folio is neither map nor text, but rather a diagram, entitled "Columnar Sections," whereon is shown the geological age and thickness of the various rock masses met with as we penetrate the rocks of the region on the folio—a sort of generalized well, it might be called. In some folios the result of several specific borings are shown.

This imperfect description of a folio must suffice. Even if it were better it would still be a poor substitute for a personal inspection, which it is hoped that all interested may have opportunity to make.

The proposed edition of these folios is five thousand, and a plan of distribution has been tentatively adopted. Questions come almost daily to the Geological Survey about the folios, and a circular has been prepared to meet such inquiries. From the circular dated March 1, 1895, we quote the following:—

"Under the law, a copy of each folio is sent to certain public libraries and educational institutions. A limited number of copies are reserved for distribution to persons specially interested in the region

represented. This distribution is at first gratuitous, but when the remaining number of copies of any folio reaches a certain minimum, a charge equivalent to cost of publication will be made. In such cases prepayment is obligatory. Remittance must be made by money order, payable to the Director of the United States Geological Survey, or by currency—the exact amount. Postage stamps, checks, and drafts cannot be accepted. The folios which are ready for distribution are listed below.

"This circular, which will be revised from time to time as other folios are completed, may be had on application. Communications should be addressed to—

"THE DIRECTOR,
"United States Geological Survey,
"Washington, D.C."

FOLIOS READY FOR DISTRIBUTION.

No.	Name of sheet.	State.	Limiting meridians.	Limiting parallels.	Area in square miles.	Price in cents.
1	Livingston.....	Montana.....	110°–111°	45°–46°	3354	25
2	Ringgold.....	Georgia..... Tennessee....	85°–85° 30′	34° 30′–35°	980	25
3	Placerville	California	120° 30′–121°	38° 30′–39°	932	25
4	Kingston	Tennessee....	84° 30′–85°	35° 30′–36°	969	25
5	Sacramento.....	California	121°–121° 30′	38° 30′–39°	932	25
6	Chattanooga	Tennessee....	85°–85° 30′	35°–35° 30′	975	25
7	Pikes Peak	Colorado.....	105°–105° 30′	38° 30′–39°	932	25
8	Sewanee.....	Tennessee....	85° 30′–86°	35°–35° 30′	975	25
9	Anthracite-Crested Butte	Colorado.....	106° 45′–107° 15′	38° 45′–39°	465	50
10	Harpers Ferry ...	Virginia ..... West Virginia Maryland	77° 30′–78°	39°–39° 30′	925	25
11	Jackson	California	120° 30′–121°	38°–38° 30′	938	25
12	Estillville	Virginia ..... Kentucky.... Tennessee....	82° 30′–83°	36° 30′–37°	957	25
13	Fredericksburg ..	Maryland.... Virginia	77°–77° 30′	38°–38° 30′	938	25

The geologists and topographers alternate in their work between field and office, spending about half the year out-doors, and the other half indoors. Just now (May 1, 1895) all is bustling activity of preparation, and parties are starting afield for a six months' outing. The final drawing and lettering of the maps surveyed last year, thirty-nine in number, are completed (and twenty-three are partially completed), and the completed maps now pass on to the editor for examination, criticism, and approval, and then go to the engraver, while the topographers return to the field for new material. Meanwhile the engraving and map-printing division of the Survey, composed of about forty persons,

go steadily forward with the engraving and printing, producing about six new topographical sheets per month. The engraving division also corrects the plates, and prints new editions of old maps as needed. At the same time, work on the geological folios is steadily getting into better condition, as the various questions incident to the beginning arise and are adjusted.

The appropriations for the ensuing year are the measure, in general terms, of the results anticipated. For the coming year the total amount is £103,000, an increase of £4000 over the current year.

In addition to this, there is one more grant of money of some importance, and which may materially influence the future of the Geological Survey. The United States for about eighty years has been surveying out, or perhaps I should say, staking out its domain and selling to settlers. It has parcelled out its lands into squares of one mile each, called sections, and these again into quarter-sections of 160 acres each. This subdividing, which need not be here described, has been hitherto done by contract. But this year a change has been ordered by Congress, and the Geological Survey has been charged with the task of making subdivisional surveys. For this purpose a grant of £40,000 has been made, and work has been already begun. Topographical surveys are to be carried on in connection with these subdivisional surveys, and improved results at lessened cost are predicted and being striven for. Should these better results be secured, the future work of the U.S. Geological Survey will be profoundly affected.

THE INDUS-DELTA COUNTRY.*—REVIEW.

By Major-General Sir F. J. GOLDSMID, K.C.S.I., C.B.

In his preface to the memoir on the ancient geography and history of the Indus-Delta country—part of which is the reprint of a prior treatise—General Haig explains his purpose to be the supply of a "rough guide for those in Sindh who, taking an interest in the past of a province, one of the poorest and, in its outward aspect, the least lovely in India, care to seek out the relics of former ages, and trace for themselves some picture of the country as it was at different periods of its generally troubled history." The object is praiseworthy and promising; but it is to be apprehended that the chosen theme is one calculated to occupy classical students and geographers at home, rather than the majority of civil and military officers, and other public servants of our Indian Empire, even those whose lot it may be to labour in Sindh itself. It is most unlikely that the kind of book-references required for prosecuting

* 'The Indus Delta Country.' A Memoir chiefly on its Ancient Geography and History. By Major-General M. R. Haig, M.R.A.S. With Three Maps. (Kegan Paul & Co., 1894.)

an inquiry of this nature should be found in the bungalows or tents of Government *employés* between Bhawalpur and Karachi; or, indeed, in any private libraries throughout India, save those of high officials, who are by no means abundant in the Delta of the Lower Indus. Pocket editions of classical authors, or detached portions of the works of early geographers and historians, might be made available for the holster and haversack, but a quarto of Dean Vincent would be an almost impossible *vade mecum*.

Dividing his inquiry into nine heads and an appendix, General Haig puts before the reader (1) a sketch of the geography and hydrography of the Delta country, as now understood; (2) the Delta at the time of Alexander's expedition, with one sketch-map of a supposititious Karachi coast, and another of Patalene, showing the coast-line 8 miles within that of the present day; (3) the Delta according to later Greek accounts, with a map giving the respective positions of Karáchi, Tatta, Haidarabad, Lakpat, and Umarkot. Then follow six more historical or semi-historical chapters, bringing the *status* down to "Lower Sindh in the modern period," or practically to the British conquest in 1842. The author's treatment of the intricate question of river changes is ingenious and indicative of careful study, involving the exercise of archæological as well as engineering research, irrespective of personal acquaintance with the local geography. But the details are too minute and complicated for more than a partial notice in these pages, and we shall confine our comments upon them to attempts at identifying places mentioned by old classical writers with known modern sites. Perhaps there is no more perplexing field of inquiry for the historical student than that in which nomenclature is the main component. Similarity of sound is so misleading to the many; and even the philologist may be at fault in his tests, though he apply them under recognized and mathematically true principles.

It will be sufficient for present purposes to glance at Appendix F, headed "The Voyage of Nearchus from Alexander's Haven to the Mouth of the Arabius," the following extracts from which comprehend much of the line of argument taken up in the text:—

(1) "As to the position of Alexander's Haven, I imagine it to be indisputable that it was somewhere in Karāchī *Bay*, though probably not in that part of it now called Karāchī *Harbour*. Something depends on the identification proposed for *Krokala*. I think Colonel Holdich attributes too much importance to the resemblance between the names *Krokala* and *Kakrālā*. It is not at all unlikely that the sandy isle was called *Kakrālā*, and that the Greeks turned this into *Krokala*.

(2) "*Sakala* may be placed, I think, a little east of *Bidok Lak*. From *Saranga* (say a few miles north of the *Hab* mouth) to this spot the distance would be 24 miles, and, though the length of the run is not stated in the narrative, we have other means of knowing . . . that it must have

been reckoned at 220 *stadia*. . . . Between *Saranga* and *Sakala* the fleet must have passed an island, though the fact is not mentioned. This was *Gadānī*, now a part of the mainland. I would identify Ptolemy's κοδάνη, on the Gedrosian coast, with *Gadānī*, which is described in the Memoirs of the Geological Survey as 'the most conspicuous hill on the coast,' and as 'peculiarly white in colour,' so that it would be likely to attract the attention of passing navigators. In point of distance from preceding anchorages, the position assigned by Colonel Holdich to Morontobara suits very well. I make it about 27 miles from Bidok Lak, and in the narrative it is said to be 300 *stadia*. It is not certain, but probable, that the 70 *stadia* stated to be the length of the inshore channel by which the sea was reached, are included in this reckoning.

(3) "The position of *Morontobara* requires, I think, further consideration. . . . Colonel Holdich's opinion that the estimate of runs between Cape Monze and Morontobara (as identified by him) are excessive, can hardly now be maintained. . . . From the shortness of the runs for the first week after leaving Alexander's Haven, it is most probable that in this part of its course the fleet had to depend on its oars alone. . . . It is in the account of the eight days' run (from Pagala to Kabana) that we first find mention of wind. . . . It is probable that sails were hoisted for the first time during the run from Pagala. . . . The anchorage for the evening at Kabana was but for a short time; . . . at midnight the fleet weighed again and ran (probably under sail) 200 *stadia* to Kokala. These runs were no doubt immensely over-estimated, as was also the next one (to the Tomerus)—put at 500 *stadia*—as well as that following (to Malana), stated to be 300 *stadia*."

In reference to the first extract, General Haig seems fairly to have established the likelihood of his proposition that the fleet of Nearchus, after sailing a winding course along the coast, and anchoring at a sandy island called Krokala, did, immediately on leaving Krokala, pass through a creek to Alexander's Haven—the two points named being at no distance apart. With regard to the remaining extracts, some of the places mentioned will be found in ordinary maps of India and the Mekran coast. Mr. Curzon's map of Persia, for example, contains one "Gadani." But there is something more to be said about the localities in question than obtained from classical or standard authorities.

More than thirty years ago the present writer was commissioned by the Bombay Government to proceed by land from Karāchī to Gwadar, with the view of certifying how far the Mekran coast route could be made available as a section of the overland telegraph-line then in contemplation for connecting the Indian with the European system. Accompanied by an escort of Sind Horse, under an English officer, and an assistant surgeon of the same force, he carried out the objects with which he was entrusted, and returned by sea to Karachi after an absence of eight weeks. The diaries of the mission were subsequently

reproduced, in a somewhat modified form, in a paper read before the Royal Geographical Society on March 21, 1863, and contained in vol. vii. of the *Proceedings*. But in the report prepared for the Bombay Government, one of the points selected for separate consideration had been "the identification of particular places with reference to ancient geography and prior narratives;" and the information embodied under this particular head was not included in the geographical paper. A few brief extracts from the section of the official report which treated of these matters (heretofore unpublished) may now be given as bearing upon the subject of General Haig's memoir:—

"In seeking to identify the places now found on the Mekran coast with those mentioned by Arrian and the geographers Strabo and Ptolemy, it has occurred to me that we should make such names as have remained unaltered for a period of at least seventeen hundred years, the basis of practical inquiry. Of these are Malan and Kalmut. That the first is the 'Malana' and the second the 'Kalama' of the historian there can be but little doubt, and from their relative positions with respect to these two points, I would at once recognize Kokala as Koocheri, the Tomerus as the Hingor, Bagasira as Ormara, and Koppah as Kophas. . . . Whatever doubts may exist on the precise localities of Krokala, Morontobara, Sangada, and the harbours, tracts of land, or towns discovered by Nearchus or Alexander between the mouths of the Indus and Sonmiani, I think we may readily concur with Dr. Vincent* in many of the deductions resulting from his researches on the coasts of the Oritæ and Ichthyophagi. Of Kokala, the Tomerus, Bagasira, and Kophas, the limited information then at his disposal enabled him to detect the modern name of the first one only, but he seldom fails to find the true position of which he is in quest. He is somewhat uncertain as to Pagana and Kabana; and though the locality intended must be generally evident to those who have visited and studied the coast route to Hinglaj, it is difficult for any one to assert a nominal identification. The surmise that Kokala is Koocheri appears to be correct. It forms a bay to the eastward which would be welcomed by boats in stormy weather, and thus corresponds with the account given by Arrian. The 'Tomerus' must be the Hingor. . . . This river is one of the most remarkable in Mekran, and rises far to the north in the Kelat state. . . . It is often written the 'Aghor,' but I take that name to apply only to the halting-place of the Hinglaj pilgrims before reaching the immediate scene of the ceremonies to be performed. . . . The distance of the Tomerus from the Malan is set down at 300 stadia. Dr. Vincent computes that $16\frac{2}{3}$ stadia equal an English mile. I know no better authority on such matters; and reckoning in accordance with this table, or from the mouth of the Hingor to

* 'The Commerce and Navigation of the Ancients in the Indian Ocean.' By the Dean of Westminster. 1807.

the nearest point of Ras Malan, we should find the sailing route to be as stated, or about 19 miles. . . . I would venture a passing observation that the word Ormára, or Oromára, savours of Portuguese origin. The only name in which I can trace its possible root amid ancient annals is 'Ora,' a supposed town of the Oritæ, which D'Anville places under the name of 'Haur,' on the Tomerus. It is not unlikely that the learned Frenchman may have misapprehended a term which is used for *all* Mekran rivers at their junction with the sea. . . . 'Khor Hingor' is pronounced by the Baluchis 'Haur Hingor,' the sound of *k* being lost as in Turkish, when united in one double letter to *h*."

To follow the report further would bring us far westward of General Haig's localities. In now taking leave of this interesting volume, we may note that it will not only be welcome, but suggestive to many inquirers.

TEMPERATURES OF EUROPEAN RIVERS.

By H. N. DICKSON.

It seems almost inexplicable that, although important information is to be expected, and has indeed in many cases been obtained, from observations of river-temperatures, there is still only a small fraction of the meteorological stations situated on river-banks which makes the recording of this element part of the ordinary routine. In a paper published recently by the University Geographical Institute of Vienna, Dr. Adolf E. Forster has collected most of the records of temperatures of European rivers which cover a long enough period to make them really useful, and the data are discussed with striking ability after the statistical methods still in most frequent use in this country. Each record is first criticized and valued on its own merits, the probable errors involved in different observational methods are discussed, and an attempt is made to reduce observations made at different hours to a true daily mean. Dr. Forster advocates the use of thermometers whose bulbs are inclosed in a badly conducting material like wax, the method of observation being to leave the thermometer immersed for a long time to take the temperature of the water. While this undoubtedly avoids the risk of great changes between the withdrawal of the instrument from the water and the time of its reading being made, it is difficult to see why the bath-thermometer ordinarily used for surface observations at sea should not serve the purpose equally well, and the need for long attendance while the thermometer is immersed is a distinct disadvantage. The material available for ascertaining the form of the daily curve of temperature is extremely scanty, the most extensive hourly record being that of M. Renou in the Loire at Vendôme. The usual diurnal course seems to be a minimum at 8 a.m. in winter and 7 a.m. in summer, a maximum at 3 p.m. all the year round, the mean

being crossed between 11 a.m. and noon. From the discussion of other changes described later, we should expect sharpening and flattening of the points of inflection under different conditions, just as these are indicated in warm and cold currents in the ocean, but there are as yet no observations to show this. For a daily mean, however, single observations at 11 a.m., or two at 7 a.m. and 3 p.m., can leave little residual error. Observations at the two last-named hours give differences closely representing the daily range, and these exist for a considerable number of stations. The average range, as well as the mean variability, shows that in all cases the temperature of a river is in the first place controlled by that of the atmosphere, and this view is confirmed by the monthly and annual changes. Other factors—radiation, cloudiness, rainfall, evaporation, friction, thermal conductivity, heat capacity, etc.—are not without influence; but the most important is, as stated by Hertzer, certainly the temperature of the air. Dr. Forster's investigations show this with special clearness, as he deals chiefly with the larger rivers. The less important elements could probably be better studied from observations on smaller rivers, such as those recently discussed by Dr. Guppy, whose paper Dr. Forster has apparently not seen.

Following this line, Dr. Forster devotes the main part of his paper to the relations between the temperatures of air and water at different seasons, and classifies the difference curves into four distinct types—rivers flowing from glaciers, from lakes, from springs and mountains, and rivers flowing through plains. Glacier streams, like the Rhine at Rheineck, the Inn at Fiefenbach, the Sill at Innsbruck, or the Rhone at St. Maurice, are markedly warmer than the air in winter, and colder in summer, the temperatures being equal about April and October. The defect in summer is usually sufficient to make the annual mean of the water at least 1·8° Fahr. below that of the air. To what distance the glacier influence may make itself felt depends, of course, upon circumstances: on the Rhone it is distinctly recognizable 84 miles from the glacier, and on the Rhine 99 miles. Rivers flowing from lakes show a differential curve of a curiously characteristic type, strongly marked in the Rhone at Geneva, the Rhine at Alt-Briesach, the Ticino at Pavia, and the Mälar at Stockholm. In this case the mean annual temperature of the water is always above that of the air, the water being the warmer during the winter half-year to a much greater extent than it is the colder during summer. The outflowing water, in fact, closely follows the temperature of the surface layers of the lake, which remains relatively high during winter, inasmuch as the supply entering the lake from mountain and glacier streams, being colder than the main body, is denser and goes to the bottom, floating the warmer water up towards the surface. The Lake of Geneva and the Lake of Constance, for example, form in this way a kind of heat-distributor, which tends to prevent the formation of ice in the Rhone and the Rhine. In the Rhine the lake

influence is distinctly marked at Kehl, and even as far as Speyer; but in the Rhone the effect is neutralized by the rapid fall and the glacier-waters of the Arve before Lyons is reached.

Streams derived from springs have the peculiarity that the water cools faster with low air-temperatures than it warms with high, chiefly because the water is kept at a low temperature by the soil, and by melting snow and ice. This characteristic, however, seldom persists for any great distance from the source. In mountain streams, which give a nearly similar curve, the greater slope of the bed and the frequent occurrence of deep narrow valleys, protecting from radiation, make the typical form recognizable further than usually happens where the spring influence acts alone, and the transition to the last or plain type of curve is delayed. The distinguishing feature of rivers of the plains is that their waters have a higher mean temperature than the air in all months of the year; and such rivers can be further classified in three divisions—according as the excess is in summer greater than in winter, is equal in both seasons, or is in summer less than in winter. The first includes the true rivers of the plain—the Elbe, the Saale, the Weser, the Loire, the Seine, the Marne, and the Thames; the second rivers, which, so far as has been observed, do not quite get rid of the marks of origin in mountain springs—the Vistula, the Warthe, the Zilligerbach, the Main, the Danube (Dillingen), the Egge, the Lech, and the Wien; while the third is simply an intermediate form, represented by the Oder, the Moldau, the Schloitzbach, and perhaps the Saône. It is obvious that the tendency must always be for all types to degenerate into the first division of the last, becoming gradually rivers of the plain. As Dr. Forster points out, there are probably really two forms of this type—that just noticed, where the water is always warmer than the air, and another where it is always colder. The latter form must be confined to countries where protracted frosts do not occur, and we have no example of it in Central Europe.

Space does not admit of even a summary of Dr. Forster's extremely interesting discussion of the inflections of the annual curves of water-temperature or of the variability of that element at different seasons. An important extension is given to Captain Meyer and Mr. Bubendey's recent investigations on the distribution of temperature of rivers before and during the formation of ice, and the final section deals with the conclusions of Rankine, Hertzer, Ule, Keller, and others, with respect to the temperature effects of friction, suspended matter, soil drainage, water-falls, etc.; all of which, it must be admitted, demand further observation. Dr. Forster's paper is an extremely suggestive contribution to physical geography, and his results should lead to a great increase of interest in the subject.

A NEW ESTIMATION OF THE MEAN DEPTH OF THE OCEANS.

Although Humboldt, in 1843, attempted to estimate the mean height of the continents, and Peschel, in 1868, computed the average depth of the Atlantic Ocean, it may be said that the first serious calculation of this kind, made with anything like adequate data, is that by Krümmel in 1878. Krümmel divided the open oceans into five-degree squares, and the enclosed seas into one-degree squares, computing the mean depth of each square as nearly as was possible with existing soundings, and obtained for the waters of the globe a mean depth of 1880 fathoms, which he corrected later to 1815 fathoms. In 1883 De Lapparent published the results of an investigation based on measurements of the contour-lines given in Stieler's Atlas for every 1000 metres. The area of each layer 1000 metres in thickness was taken as the mean of the area of its upper and lower contours, and the final result gave a mean depth of 2330 fathoms. Next followed Dr. John Murray's work, published in 1888. This was founded on measurements of contour-lines for every 500 fathoms, made with the planimeter from maps by Bartholomew. Each layer was divided into a prism whose cross-section was the area of the lower contour-line, and a quoit-shaped surrounding ring of triangular section, the horizontal distance between the two contours forming the base of the triangle. The ring was treated as a prism the area of whose base was the difference between the areas of the contour-lines, and whose height varied from one-half to two-thirds of the vertical distance between the contours. The mean depth for all the oceans obtained in this manner was 2076 fathoms. Using Murray's data, but taking the height of the surrounding ring as half the vertical distance between the contours throughout, Supan obtained a mean depth of 1996 fathoms. Penck almost at the same time introduced a graphic method, by applying which to Murray's data he obtained the same result as Supan. In 1889 von Tillo, employing Bartholomew's maps in a somewhat different way from Murray, obtained almost exactly Murray's result. Lastly, Heiderich, in 1891, returned to the method originally employed by Humboldt, and from measurements of vertical profiles drawn for every five degrees of latitude gave the mean depth of the oceans at 1880 fathoms, Krümmel's earlier value.

In a recent paper Dr. Karl Karsten has criticized each of the above methods in some detail, both from a theoretical point of view and by practical application to a test case. All determinations depending on planimeter measurements are, of course, subject to the considerable errors unavoidable in using that instrument, and in the work of Murray, Supan, and von Tillo, a further uncertainty is introduced by the more or less arbitrary assumptions which have to be made in calculating the volumes of the quoit-shaped rings. This second difficulty is to some extent got over by the graphic method of Penck, in which a

series of points, whose ordinates are proportional to the depths below the surface, and abscissæ to the areas of the contour-lines at the corresponding depths, are joined by a curve, and the area of the curve measured by the planimeter. But none of the planimetric methods are free from a third source of error, due to the comparatively wide vertical intervals between the lines of measurement. With measurements every 500 fathoms, for example, a depression inside a closed 500-fathom line might go down to 550 fathoms or to 950, and the estimated volume of water contained would be the same.

Heiderich's method of profiles is free from many of the objections to which measurements of contour-lines are subject; but there remains the case analogous to that just mentioned, the great distance between the parallel profiles. Any attempt to improve either method by increasing the number of contour-lines or of profiles virtually converts it into Krümmel's method of estimating the volume of prisms of equal cross-section, by averaging all the available soundings for each square and thereby arriving at the mean depth—a method which has the advantage of being independent of the scale of any map employed, and of being applicable with greater or less degrees of refinement as the locality under investigation seems to require.

Applying the various methods to an area, the depths of which have been fully explored, Dr. Karsten obtains the following results for the Carribbean and Gulf of Mexico:—

	Carribbean Sea.		Gulf of Mexico.
	Northern half.	Southern half.	
Murray and v. Tillo ...	1488 fathoms ..	1498 fathoms ..	855 fathoms
Hiederich's formula I.	1421 „ ..	1433 „ ..	803 „
„ „ II.	1408 „ ..	1418 „ ..	822 „
Penck	1426 „ ..	1426 „ ..	841 „
Method of squares ...	1374 „ ..	1456 „ ..	851 „

Here Murray and von Tillo's methods are combined by assuming in both cases that the volume of the quoit-shaped rings is equal to the product of the base by two-thirds of the height; Hiederich's first formula treats the layers as prisms whose vertical section is a trapezium, and the second formula as conical frusta. The last line is calculated from measurements of one-degree squares. Dr. Karsten finds that the superficies of the whole area obtained by the planimeter differs from that given by the measurement of squares by about three per cent., while his result by the latter method agrees with that of Krümmel to within 0·035 per cent. The planimeter measurements were repeated at least five and sometimes more than ten times, and their inconsistencies, combined with the fact that large-scale charts could not be employed, quite account for the large differences. Larger differences occur in the volumes and mean depths; Murray and von Tillo's method gives for the southern part of the Carribbean Sea nearly 8 per cent. more than the method of squares,

from which it would seem that the fraction two-thirds gives too high a result for the volume of the quoit rings. Heiderich's formulæ naturally give lower results, but in the Gulf of Mexico a marked improvement is noticeable with the second formula, which treats the bottom layer as bowl-shaped instead of conical—making a difference of 22 fathoms in the mean depth. Penck's graphic method, as well as the others, suffers from not taking account of the numerous irregularities in the relief of the bottom.

Having made out a case for Krümmel's original method in the manner indicated, Dr. Karsten has recalculated the mean depth of each five-degree square in the open oceans, and of each one-degree square in the smaller seas and enclosed basins. The values for each square are given in his paper in detail, and the general results are summed up in a table, from which we extract the following:—

	Mean depth, fathoms.	Area, square miles.	Volume, cubic miles.
Atlantic Ocean with Arctic ...	1728	39,690,691	77,966,975
Indian Ocean	1965	28,598,860	63,855,433
Pacific	2094	67,768,210	161,260,106
Antarctic	820	6,037,313	5,628,376
Total	1912	142,094,474	308,710,890

We may draw attention to a misprint on p. 27, which makes the area of the Atlantic 102,755,679 square kilometres, instead of 102,753,679.

THE SIXTH INTERNATIONAL GEOGRAPHICAL CONGRESS.

Probably most of the Fellows of the Society are already familiar with the main course of events during the Congress, but as it has already become to some extent a matter of history, we may now be better able to form some estimate of its net result. In the first place, it is our pleasant duty, as the hosts of the foreign Delegates and Representatives, to express our appreciation of the cordial manner in which they entered into all the arrangements which had been made, thereby reducing the burden laid upon the Committee to a minimum, and contributing an indispensable factor to the success of the meeting. In geographical science, as in many other things, our methods in this country tend to become insular, and we accordingly derive all the greater benefit and stimulus when the leaders of geographical thought on the Continent and in America come and give us of their best.

The leading principles which guided the arrangements of the Congress have already been explained in the *Journal*, and in practical work they have not been found wanting. The foremost place was invariably given to the deliberative meetings, and the small number of separate

sections prevented anything like degeneration into mere technical discussion of details. At the same time, the exhibitions were by no means neglected, nor were the various social gatherings felt to be unduly burdensome after the labours of the day.

The comparatively short time for which the space in the Imperial Institute was at the disposal of the Exhibition Committee before the actual opening of the Congress, put a somewhat severe strain on the Committee's resources; but, thanks to the zeal and energy of Mr. Ravenstein, the general secretary of the Exhibition, and Mr. Coles, with their devoted assistants, the arrangement and cataloguing of the objects exhibited, with a few exceptions, were completed in time. The foreign exhibits, the exhibits of learned societies, government departments, and private firms, were placed on the first and second floors of the east wing of the main building; the collection of paintings and photographs, under the charge of Mr. John Thomson, was arranged in the corridor of the first floor; while the loan historical collection and the instruments were disposed in an iron building specially erected in the south-west quadrangle, part of which was also occupied by exhibits of travellers' outfit and equipment. In the foreign section the countries chiefly represented were: Germany—a collective exhibition from the Berlin Geographical Society being arranged by Dr. Karl von den Steinen, President of the Society—Switzerland, France, Sweden, Norway, Denmark, the Netherlands, Belgium, Austria-Hungary, Italy, Portugal, Spain, Russia, Finland, the United States, and Mexico. The exhibits of these countries were almost exclusively modern, historical geography being restricted to Mr. Ravenstein's admirably arranged illustrations of the development of the art of cartography, and Mr. John Thomson's interesting series of portraits of eminent travellers, cartographers, and authors of geographical works. The chief public departments of the United Kingdom were well represented, as well as India, Canada, and South Africa. The general catalogue of the exhibition, although of modest proportions as such things go, is undoubtedly a document of permanent value, from both an historical and an educational point of view.

The Congress was formally constituted on the evening of Friday, July 26, by H.R.H. the Duke of York, one of the Honorary Presidents. The Delegates and Representatives of colonial and foreign governments and geographical societies were first presented to His Royal Highness, most of them by the Ambassadors or Ministers of their respective countries, and in the case of the Colonial Delegates by Lord Selborne, and thereafter the Duke of York addressed the whole Congress, extending to its members a cordial welcome on behalf of Her Majesty the Queen. Mr. Clements Markham, as President of the Royal Geographical Society, then welcomed the Congress on behalf of the geographical societies and geographers of the United Kingdom; and

after Chief Justice Daly, the oldest President of a Geographical Society living, had replied in a short but most felicitous speech, the Congress adjourned to a reception in the gardens.

On Saturday morning the President delivered his opening address to a brilliant audience, and a letter of greeting to the Congress from His Majesty the King of the Belgians was read; also a telegram from the East Siberian section of the Russian Geographical Society, dated from Kiachta. Two sections met in the afternoon, one dealing with geographical education, and another with the applications of photography to surveying. In the former, papers by Professors Levasseur and Lehmann afforded British members of the Congress an opportunity of gaining insight into the methods of teaching geography common in France and Germany, with the result of exciting considerable sympathy with the appeals made by Messrs. Mackinder and Herbertson, and other teachers of the subject in this country, for improved methods in our schools and universities. A committee was appointed to draft a resolution commending these efforts to place geographical teaching on a better footing to those responsible for our educational interests. Photographic surveying naturally appealed to a smaller audience, but considerable interest was manifested in a combined camera and theodolite exhibited by M. Schrader, and in Colonel Stewart's "Panoram" for photographing the whole horizon, which was described and exhibited by Mr. Coles. In the evening a large number of foreign guests dined with the Geographical and Kosmos Clubs, "on the meridian," at Greenwich.

On Monday the general session of the Congress was devoted to polar exploration. The discussion on the Antarctic Regions centred round a paper by Dr. Neumayer, which briefly stated the case for a scientific expedition on an adequate scale, pointing out the additions to be expected in various branches of natural knowledge. Dr. Neumayer was supported by Sir Joseph Hooker, Dr. John Murray, Sir George Baden-Powell, General Greely, and Professor Guido Cora, and a committee was appointed to draw up a resolution. The subject of Arctic exploration was introduced in an interesting paper by Admiral Markham, who was followed by General Greely and others, and Herr Andrée unfolded his daring scheme for reaching the North Pole by means of balloons.

The sections, which met in the afternoon, were concerned with physical geography and geodesy. Papers were read on the Modification of the Normandy Coasts, and on the Periodic Variations of French Glaciers, by M. S. Lennier and Prince Roland Bonaparte respectively, and the question of the decimal division of time and angles gave rise to some animated discussion. In the geodesy section M. Charles Lallemand gave some account of the work of the French surveys, and papers were read on the geodetic work of the Indian and Cape of Good Hope Survey Departments.

On Tuesday the general meeting received reports on matters which

had been held over from the Congress at Berne. The system of appointing committees at one Congress which had to maintain an independent existence as best they could until the constitution of the next, not having been found to work very satisfactorily, the Congress took the important step of resolving, on the motion of Professor Brückner, that the leading officials of each Congress shall retain their posts during the interval following. A kind of permanent commission is thus established, which will serve to keep the various committees together and assist them in carrying out their special duties. The commission appointed at Berne to consider Professor Penck's proposal that a map of the world on a scale of 1 : 1,000,000 should be constructed, submitted a report of its committee favourable to the scheme, and its recommendations were afterwards unanimously approved by the whole Congress. The commission was, on its own recommendation, merged in the permanent executive.

Tuesday's sectional meetings were occupied with oceanography and with geographical orthography and definitions. Professor Libbey's paper, on the Relations of the Gulf Stream and the Labrador Current, contained some interesting results bearing on the relations of oceanography to marine zoology. In the other section, Mr. Chisholm's paper on the spelling of place-names gave rise to some discussion, and a proposal that a resolution touching this difficult question should be drawn up and submitted to the Congress, was adopted.

Wednesday was the great field day on Tropical Africa, and the interest of the proceedings, so far as it can be judged by the attendance of members, attained its highest point. The question discussed was, "How far is Tropical Africa suited for development by white races?" and it was attacked from every possible side by Sir John Kirk, Count Pfeil, Mr. Stanley, Mr. Ravenstein, Mr. Silva White, M. Lionel Dècle, Colonel Slatin Pasha, Major Baker, Captain Hinde, M. J. Vincent, Dr. Bassaria, Captain Amaral, Dr. Sambon, Dr. Murie, and Mr. Louis. Later in the day a paper on the Mapping of Africa was read by General Chapman, and a resolution was proposed and referred to a committee. Mr. Silva White followed with a paper on his chrestographic map of Africa.

Only one section met in the afternoon, at which Professor Petterson's scheme for further international work in the North Sea was considered, and a paper on limnology by Dr. Mill was read.

On Thursday, Mr. C. E. Borchgrevink, who had been unable to reach England in time for the discussion on the Antarctic Regions on Monday, received an enthusiastic reception, and after he had read his paper, giving an account of the voyage of the *Antarctic*, the Congress offered him its congratulations on the results of his work. Professor Kan then read a paper on New Guinea, and Mr. Lindsay discussed future exploration in Australia. One of the sectional meetings was devoted to cartography, Professor Elisée Reclus reading a paper on a proposed terrestrial

globe on the scale of 1 : 100,000. In the other section, Dr. Naumann compared the fundamental lines of Anatolia and Central Asia; and Mr. Henry G. Bryant gave an account of observations on the most northern Eskimo, chiefly made during the Peary Relief Expedition.

Friday's papers were of less general interest, although sufficiently important to specialists. The general session dealt chiefly with ancient maps, a paper by Baron Nordenskiold being presented by the President. Towards the end of the meeting, M. Batalha Reis made an interesting announcement of the discovery of an authentic portrait of Prince Henry the Navigator at Lisbon. The sections heard papers on speleology and mountain structure, and on the morphology of the Earth. The audiences at all the meetings showed that many members evidently regarded this as the "off-day," and had gone to study geography practically elsewhere.

On Saturday only one paper was read, by General Anneukoff on the importance of geography in the present agricultural economical crisis. The resolutions drawn up by the various committees or submitted by private individuals were then put to the meeting, and after the usual reports and votes of thanks, the President delivered a short concluding address and dissolved the Congress.

Such, in barest outline, is the record of proceedings. We have already alluded to the harmony and cordiality which prevailed throughout, but we cannot refrain from specially recording the graceful act of international courtesy performed by the American delegates in supporting the motion that the Congress should accept the invitation of the Berlin Geographical Society to hold its next meeting in Berlin in 1899. A cordial invitation to Washington had been received from the National Geographical Society, supported by the United States Government, but there was a general feeling that the time was not yet ripe for a meeting on the other side of the Atlantic.

And the work of the Congress is not all "proceedings." We take it that one of the chief functions of such a body is to produce "transactions" in the form of distinct findings which shall represent the state of expert opinion on the most important matters coming within its province. Such findings will enable the private individual to ascertain, not only what problems are most urgently in need of solution, but also what methods are considered the best in dealing with them. In this respect the Geographical Congress cannot be said to have come short. We have already referred to the resolutions adopted with reference to Antarctic exploration, to the mapping of Africa, to geographical education in this country, and to the mapping of the world on a scale of 1 : 1,000,000. We may further notice some of the resolutions passed at the final meeting on Saturday, recommending further international co-operation in the physical survey of the North Sea, the organization of a uniform system of seismic observations, the explicit dating of all maps, and approving the principle of State printed registration of

literature. On all these subjects, and on many others, the Congress, by large majorities, gave authoritative deliverance.

This Congress will be notable for two innovations tending to give the body a permanent constitution and to promote harmonious feeling among the different nationalities composing the Congress. The former object was accomplished by deciding, as has been stated, that the acting officials of each meeting shall hold office until the next meeting. For the first time also, we believe, an Advisory Committee was instituted at this meeting, consisting of the Vice-Presidents representing every nationality, to which all resolutions and other important matters were submitted before being brought before the general meeting of the Congress. This plan was found to answer excellently, and no doubt it will be continued at future meetings.

Extra meetings and demonstrations were reduced to the smallest number possible, but the few for which arrangements were made must not pass unnoticed. Miss A. M. Gregory gave demonstrations of her geodoscope, which was exhibited in the instrument section; and towards the end of the meeting Mr. W. B. Blaikie, of Edinburgh, explained the construction and use of his cosmosphere, an ingenious instrument for illustrating the facts of astronomical geography. On Monday evening Professor W. Libbey exhibited a large number of lantern slides made from photographs taken by himself in the north of Greenland, in the Sandwich Islands, and in many parts of America. Dr. Mill gave on Thursday evening a very successful demonstration of the advantages of working two lanterns simultaneously, in the form of a lecture on his surveying work in the English Lakes.

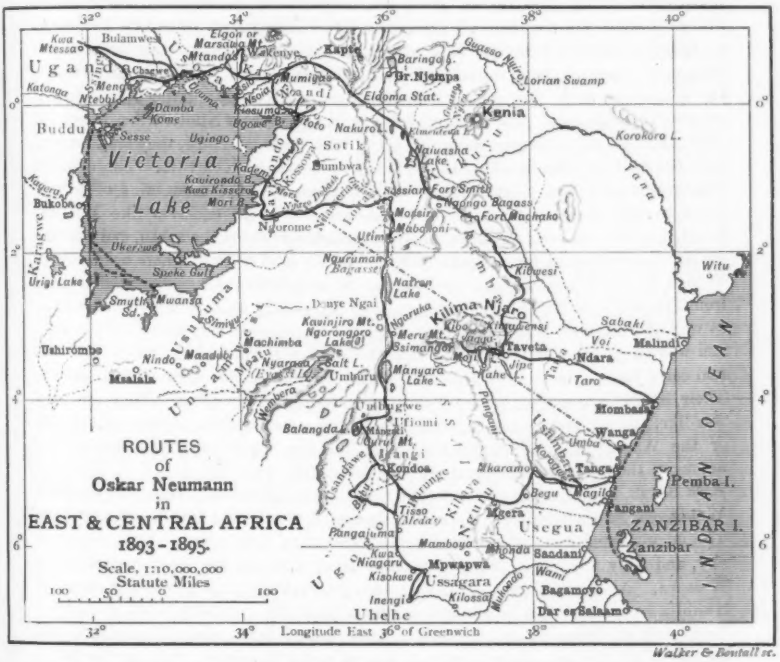
We cannot refrain from stating, in conclusion, that we have received spontaneous assurance from many influential quarters at home and abroad that the Sixth International Geographical Congress has been an almost unqualified success.

NEUMANN'S JOURNEY IN EAST AFRICA.*

Herr Oskar Neumann's expedition, the objects of which were mainly zoological, set out from Tanga on April 27, 1894. Beyond Mgera the route led to Trangi by the direct road through northern Nguru, which was followed by Dr. Fischer in 1885, but had not been since traversed. It passes through a region abounding in ostriches, zebras, gnus and other antelopes. The progress of the expedition was here opposed by the Kibaya, the most south-easterly tribe of the Masai, and it became necessary to repel them by force of arms. After an excursion from Irangi to Usagara, the expedition, 130 strong, started first, on September 20, for Mount Gurui, which the leader was the first European to ascend (October 11). The ascent presents no exceptional difficulties; one zone only, lying from 650 to 1300 feet below the summit, covered with a brushwood of ferns, azaleas, and rhododendrons, proved a serious obstacle. Even the extreme summit is clothed with a vegetation of Alpine flowers and short grass. Just below the top, a pair of the most elegant

* Abstract of paper read at the Berlin Geographical Society.

little antelopes (*Oreotragus saltatrix*) was observed. The peak has no crater, but in the plain there are two valleys trending from south-west to north-west, which show manifest traces of volcanic action, in the form of scoriæ and masses of pumice. Far away in the south-west an extensive natron swamp was to be seen, which, to all appearance, is double the size of the Sagarassa lake at the foot of Mount Gurui. In the beginning of November the expedition encamped in Umbugwe, on Lake Manyara. On the eastern shore of the lake hot sulphurous springs issue from the walls of the Umburru plateau, which attain a height of from 650 to 1000 feet. The lake is very strongly impregnated with natron, and so shallow that it is possible to wade in it for a distance of 2 or 3 miles from the shore. The bird fauna is very extensive. Thousands of pelicans and flamingos line the shores, countless



flocks of plovers and sandpipers course along the margin, while geese and ducks are no less numerous; and with them may be seen grey and white herons, cormorants, ibises, marabu, and Yabiru storks and Balearic cranes.

From Ndalalani, on the west shore of the natron swamp of Nguruman, an attempt was made to ascend the Donye Ngai, which, however, was not entirely successful, owing to the extreme steepness and the crumbling nature of the upper lava-slopes, which were coated with natron. About 500 feet below the main summit a small active vent of steam was observed. According to the statements of the Masai, who dwelt in the vicinity, an eruption has taken place within the last decade. A famine was raging at Nguruman, at the north end of the natron lake, whence a friendly old Mkuafi offered himself as guide to Ngoroine. From Rangata Lungatun, south of Sossian, the difficult ascent to the Loita mountains

was made. The road leads through an upland country, rising in terraces and intersected by many valleys, in which flowed streams fringed with high trees. The only traces of the Masai, who once lived here in large numbers, but were ruined by the cattle plague, consisted in numbers of broken-down huts made of branches, old mouldy skins, and skulls of cattle and human beings. Advancing westwards, the expedition came upon the Ngara Busse, which empties itself into the Ngaro Dobash, and, following this downwards, arrived at Ngoroine on January 28, 1894. The Wasegeyu of Ngorome are very friendly, but also very dirty people, much given to smoking tobacco and hemp, and living in large villages surrounded by candelabra euphorbias. North of the Ngaro Dobash (here called Mara), Uturi, one of the most southern districts of Kavirondo, begins. Proceeding northwards along the bay of Mori, the expedition, on reaching the sultan's village Kaden, on the bay of Kavirondo, was surrounded by many thousands of Wagaia warriors, and was only saved by hastily occupying and fortifying a village, and making daily sallies from it. The fight lasted nine days, after which the Wagaia of their own accord offered a truce, and celebrated the conclusion of peace with festivities. The Wakavirondo, or Wagaia, are a Nilotic tribe, who have only migrated here in recent years. Judging from their language, they are identical with the Shilluk, who dwell on the White Nile south of Khartum. The original inhabitants have been either driven back by them into the mountains of Nandi, Lumbwa, and Kossova, or have been hemmed into small enclaves like Mohuru, Utegi, etc. The new-comers are constantly pressing towards the south, and already extend their forays as far as Speke gulf, and in the land of Ururi there are no more Waruri, but all the inhabitants are Wagaia. Their powerful forms distinguish them from the people of Nandi and Lumbwa, who are nearly akin to the Wanderobbo, as well as from their Bantu neighbours to the north-west and south. Both men and women go completely naked. The warriors are painted black, white, and red, and carry large shields of buffalo-hide, and quite the longest spears in all Africa. Their houses are round, built of clay, and are kept very clean. They are very war-like, and if they are not engaged in a common war against Kossova, Lumbwa, or the Waseguyu of Mukenye and Ngorome, the small sultanates are at war amongst themselves. The journey was continued past Mhugu, Kwa Niadoto, Kwa Buosh, and Kwa Magambo to the mountains of Kossova. The villages of the Wakossova lie scattered over the mountains, each numbering five to twenty huts. The uncultivated parts of the land are covered with high grass. The people are shy, and very thievish. Many a Swahili ivory caravan has been massacred in Kossova. At Kwa Kitoto, on Ugowe bay, where there is a permanent camp of Swahili ivory traders, a long stay was again made, for the purpose of collecting. East African types of animals are already scarce here, while Abyssinian and typical West African species occur in almost equal numbers. Among the latter a bright-coloured monkey (*Cercopithecus neglectus*), hitherto found only on the White Nile and in French Congo, is especially worthy of mention.

From Mumiya the traveller proceeded to Uganda, in order to obtain permission from Colonel Colville to extend his journeys further into the British sphere. Usoga, which begins a few miles west of the Sio, is one vast banana grove. Unlike the Waganda, the Wasoga like to colour their bark-cloth grey and black. There is not a more thievish race in existence than the Wasoga. From Ntebbi, the head-quarters of the governor, Herr Neumann repaired first to Bukoba and Mwanza to replenish and complete his equipment, and then visited Northern Uganda, traversing the province of Chagwe, and on September 6 was on the river Maianya. Here the landscape is again typically East African, with bush and steppe, and accordingly quantities of game. Besides zebras, waterbuck, etc., the *tsunu*, a characteristic

Central African antelope, is very common. The elephant occurs in troops of some hundreds.

On the return to the coast, still another excursion was made in a north-north-east direction from Mtanda's, in the direction of Elgon, and after three days' march a broad stream with lake-like expansions was met with. The Wakenye, who are settled here, dwell in houses built on piles, which occur either singly or three or four together in the cypress thickets which fringe the stream. The house is round, and the floor consists apparently of planks covered with clay. It is raised from six inches to a foot above the surface of the water. In front of the houses is a floating mass (called tinka tinka by the Swahili), consisting of reeds, pieces of wood, and sedge, held together by the cypress growth. This tinka tinka, on which one can walk—constantly sinking in, it is true—serves the Wakenye as a courtyard, where they keep poultry and dogs, and occasionally even a sheep or a goat. They procure these, as well as the meal which they use, from the Wasoga and Wanyole in exchange for fish. Further to the north-east, in the direction of Elgon, the warlike Wadola are said to live, and to the north the Wakeddi.

On November 11, the expedition started for the coast from Mumiya's by the main Uganda track, which it left just beyond Kibwezi, and proceeded over the very volcanic Kyulu range to Kilimanjaro, whence Mombasa was reached on February 5.

The zoological collections yielded about 2500 insects of about 1000 species, about 200 species of crustacea, 50 species of molluscs, 250 fishes of 30 different species, 400 reptiles and amphibia of 90 species. Of birds about 600 species, represented by 2500 specimens, were brought back, and of mammals 275 specimens of 90 species, including five new to science.

THE MONTHLY RECORD.

EUROPE.

The Waterways of the Seine Basin.—In a Foreign Office report (Miscellaneous Series, No. 336) lately published (with maps), Mr. Consul O'Neill gives some interesting particulars respecting the fluvial traffic of the port of Rouen, and, generally, the part played by internal water-routes in the development of the trade of France, particularly in the Seine basin. At Rouen the fluvial side of the port, which is quite distinct from the maritime, possesses unusual importance, the distinguishing feature of the trade being its dependence upon the interior navigable waterways. This is shown by the fact that the latter take from the port more than five-eighths of all the goods brought to it by sea, the railways taking a very inferior share. Instances are given of the introduction into Central France of products of foreign countries by this means, although such products may exist in neighbouring parts of the country not possessing means of water-transport. Besides heavy raw materials unable to support railway rates, there is a large distribution of agricultural and chemical products, groceries, wines, petroleum, etc., from Rouen by the water-routes, and industries have often been enormously developed by the cutting of canals through certain districts. The waterways of France are most naturally grouped according to the four main river-basins, but of these the Seine shows a great superiority, due, according to Mr. O'Neill, to the steadiness of its water-supply throughout the year, and also to the facilities which there exist for connection with other countries. The waterways of the Seine basin, and those in immediate connection with it, are divided, for statistical purposes, by the Department of Public Works into seven main divisions, and a clear analysis of the traffic for these lines is given in the returns published by the French Government. After first glancing at the international traffic by canal between France, Belgium,

and Germany, Mr. O'Neill enters into particulars respecting the most important of these interior lines, paying special regard to the nature of the traffic they carry, and to the industrial, agricultural, and commercial interests they serve. Over the "northern line" from Paris to the Belgian frontier, coal is the chief amongst the goods carried. The branches of the Canal des Ardennes form links in a direct route south to the eastern departments, and the traffic is principally made up of goods in transit. Of the waterways which unite the English channel with the Mediterranean, the Canal de Bourgogne is less used than by way of the Bourbonnais, partly because of the decline of the steam industries of the country through which it passes, partly on account of the greater elevation over which it is carried. The Canal de l'Est and the Canal de la Marne au Rhin possess a great importance through the facilities which they give for the transport of coal to the district of Nancy. In the competition between the northern maritime ports for the trade of this district, Rouen takes the largest share of the canal traffic. Finally, the Seine from Paris to Rouen and the sea is the most important waterway in France, both for extent of traffic and facilities of navigation.

ASIA.

The Pamir Commission.—The Delimitation Commission now engaged on the Pamirs arises out of clause 2 of the Anglo-Russian agreement, recorded in Lord Kimberley's letter to M. de Staal of March 11th last (*Parliamentary Paper*, Treaty Series, No. 8 of 1895). The clause referred to provides that a joint Commission of a "purely technical character," with a small military escort, shall mark out the exact run of the line between the spheres of influence of the two empires east of Lake Victoria (Zor Kul). This line (so runs the wording of the agreement), "starting from a point on that lake near to its eastern extremity, shall follow the crests of the mountain range running somewhat to the south of the latitude of the lake as far as the Bendersky and Orta-Bel passes. From thence the line shall run along the same range while it remains to the south of the latitude of the said lake. On reaching that latitude, it shall descend a spur of the range towards Kizil Rabat, on the Aksu river, if that locality is found not to be north of the latitude of Lake Victoria, and from thence it shall be prolonged in an easterly direction so as to meet the Chinese frontier. If it is found that Kizil Rabat is situated to the north of the latitude of Lake Victoria, the line of demarcation shall be drawn to the nearest convenient point on the Aksu river south of that latitude, and from thence prolonged as aforesaid." The Amir of Afghanistan is to be represented on the Commission, and the latter body is to collect data as to the Chinese frontier, so as "to enable the two governments to come to an agreement with the Chinese government as to the limits of Chinese territory in the vicinity of the line." Clause 4 provides that the British and Russian governments, respectively, abstain from exercising any political influence or control, the former to the north and the latter to the south of the above line of demarcation, while the British government on its side engages (clause 5) that the intermediate territory between the Hindu Kush and the new line east of Lake Victoria shall not be annexed to Great Britain, and that no military posts or forts shall be established in it. Further, there is an important clause towards the end of the agreement, recording that the execution of the agreement is contingent upon the evacuation by the Amir of Afghanistan of all the territories occupied by the latter on the right of the Punjab, and on the evacuation by the Amir of Bokhara of the part of Darwaz south of the Oxus. It will be observed that this agreement is practically a settlement for good of the international frontier difficulty. The area of territory ceded by Afghanistan north of the Oxus is far larger than the corresponding territory south of that river, to be given up by the Amir of Bokhara. On the other hand, the arrangement of the

line east of Lake Victoria is a distinct gain for Great Britain, as it shuts out all possibility of the Russian outposts coming down southward and threatening the passes leading over the Hindu Kush. The wording of clause 5, however, while it concedes this strip of country to the Amir, debars his Highness apparently from erecting forts in that portion of his own territory. With regard to the delimitation of the Chinese frontier, the agreement wisely recognizes the fact that this is a matter which concerns England as well as Russia, and provides that the agreement with China over this point shall be undertaken by both governments. On the whole the frontier arrangement may be pronounced to be satisfactory, and calculated to bring about a permanent settlement of this long-standing difficulty. The *personnel* of the British section of the Commission consists of Colonel Gerard, Central India Horse, commissioner-in-chief; Colonel T. H. Holdich, C.B., and Major Wahab, survey officers; Surgeon Captain Alcock and Captain McSwiney in charge of the camp, and a small escort of Pathan-speaking men of the 20th Punjab Infantry. The route taken by the members of the Commission was by way of Gilgit, Yasin, and the Darkot pass. It is expected that the demarcation will be finished by the end of August.

Tibeto-Sikkim Boundary Commission.—Another joint international boundary Commission has been charged to demarcate by means of boundary pillars the run of the Sikkim frontier. The object is to prevent the occurrence of local disputes, the exact line in some places, especially on the passes, being difficult to determine. The British part of the Commission, consisting of Mr. White, accompanied by Captain Pressey and Dr. Ewens, with an escort of about forty men of the 4th Bengal Infantry, met the Chinese representative, Major Tu Hsi, and his suite at noon on May 18, on the summit of the Jelap pass, at an elevation of 14,700 feet. With the Chinese envoy are an English-speaking and a Tibetan-speaking assistant. As soon as the weather proved favourable, it was the intention of the Commission to erect pillars on the Bhutan side, where the Gipmochi peak is the most striking feature of the landscape. Having completed demarcation here, the Commission propose to retrace their steps and proceed almost due northward, where the country is still more mountainous, the very passes here being 16,000 and 17,000 feet above sea-level. It is anticipated that the whole of the summer will be occupied in demarcation, the party eventually working round to the sources of the Teesta and its affluents. The Chinese, it is said, are loyally helping the British; but the Tibetans are obstructive, and actually pulled down the pillar erected on the Jelap La Pass. A detachment of the Manchester regiment is stationed at Gnatong. The most recent news is that the opposition of the Tibetans has necessitated the abandonment of the work of the Commission.

M. Dutreuil de Rhins' Journey in Central Asia.—Previous notices of this journey having been somewhat vague and fragmentary, the connected account given by M. Grenard, the companion of the unfortunate leader of the expedition, before the Paris Geographical Society, is of considerable interest (*Comptes Rendus*, 1895, pp. 228 *et seq.*). Leaving Paris in February, 1891, the travellers proceeded *viâ* Osh and Kashgar to Khotan, the starting-point of exploration proper. The first season's work (eventually spread over the second also) consisted of an exploration of the mountains south of Khotan and Keria, the routes of M. de Rhins differing considerably from those of previous travellers (Carey, Pevtsof, etc.). M. Grenard gives the name Altyn Tagh to the whole of the outer range which bounds the Tarim basin on the south, and parallel with this to the south he places a second continuous range, called Ustun Tagh, which has a higher elevation, but less sharp outlines. The ranges, where crossed, are entirely devoid of living beings. The most important part of the journey began in the third season (1893), when the explorers moved on

to Cherchen, and, having obtained a supply of camels, decided to traverse the mountains south of that place, in which direction a wholly unexplored tract lay before them, the routes of Prjevalsky, Carey, and Bonvalot, lying considerably to the east, while Pevtsof's expedition had here merely skirted the range. The pass over the Altyn Tagh proved unusually easy, the range there spreading out into several branches, and displaying gentler slopes and more open valleys than elsewhere. The second range, here known as Arka Tagh (Akka Tagh of the Society's map of Tibet), was reached near the source of the Kara-Muren river. The route led into a chaos of mountains, absolutely arid and barren, without a blade of grass or the trace of a single animal. The main ridge was crossed at a height of 18,800 feet. Further east, a magnificent group of snowy mountains reached a height of 25,000 feet. A salt lake 25 miles long was passed, surrounded by mountains of a vivid red-brick colour. Beyond this game was met with, the hills becoming smaller, and the valleys producing a short, poor grass, and traces of a Tibetan encampment, probably of hunters, were seen. More high ranges were crossed under the blast of a freezing wind, and turning more to the south-west towards the position assigned on the maps to Thok-Daurakpa, the travellers reached lower altitudes and once more saw traces of inhabitants. Hence for some distance in an easterly direction the route almost coincided with that of Captain Bower, but kept to the north of the lakes Chargut-tso and Garing-tso, and the travellers passed the point at which the English explorer was turned back, pushing on as far as Lake Nam-tso (Tengri Nor), the vicinity of which they carefully explored. Here they were met by officials from L'hasa, and all attempts to obtain permission to proceed southwards were fruitless. It was therefore resolved (in spite of great opposition) to take the route *viâ* Nak Chu to Sining. A deviation was made for the purpose of exploring the sources of the Mekong, and the most northern of the three commercial routes from L'hasa to Ta-tsien-lu was struck, the same that was followed for some distance by Miss Taylor. The lamas proving hostile, M. de Rhins repaired to Kierkudo (Kegudo of A— K—), the residence of a Chinese functionary, situated near the upper Yang-tse-kiang (the Tibetan name of which M. Grenard gives as Do-chu, not Di-chu). In the basin of the Dza-chu, or upper Mekong, the soil was generally red, the streams being enclosed in narrow gorges. The inhabitants are shepherds living in tents. All the Tibetans of these regions are said to be much more wild and violent than those further west. At Kierkudo the unfortunate affray took place which led to M. de Rhins' death. The cartridges having been all expended, and M. de Rhins fatally wounded, M. Grenard was left alone amidst the Tibetans, by whom he was seized and carried to the Yang-tse. He succeeded in crossing the river, and made his way to Sining, where he was kindly received by the Chinese authorities, and eventually all the papers of the expedition were recovered. Besides the route-surveys and astronomical and meteorological observations, extensive collections had been made, and over a thousand photographs taken.

New Summer Resort in Northern Persia.—A letter dated July 6 last, from "Killister, Rahmatabád"—a spot lying north of Manjil, on the well-known post-road connecting Resht with Tehran—gives an interesting account of a *yailák*, or summer resort, newly occupied by European residents in the Shah's dominions. Like the whole of Persia, the particular tract to which it belongs is stationary and without sign of progress; but the climate is described as delicious, and the native inhabitants, though poor, appear contented enough to illustrate the truism that happiness is independent of riches. In addition to the country brown bread (*nán-i-lavásh*), rolled out in sheets like a blacksmith's apron, these last can boast their little stock of curdled milk, nuts, and olives, the luxury of meat, however, being denied to the greater number for even one day in the week. Their lambs supply

them with wool for winter clothing; they are much in the case of the man depicted by Pope—

> "Whose herds with milk, whose fields with bread,
> Whose flocks provide him with attire;
> Whose trees in summer yield him shade,
> In winter fire."

Idle and peaceful, they dwell in an atmosphere far superior to that of the plains, which, with their extensive rice-fields, are redolent of malaria. Said to be religious without fanaticism, they are little interfered with or molested by the outer world; and, being practically destitute of substance, they are spared the recurring exactions of governors and revenue collectors' agents, ever ready to squeeze a submissive population. Our correspondent, a physician of kindly heart and high professional repute in Persia, is himself engaged in ministering to the wants of many native patients gathered around him in these parts, and will doubtless acquire an exceptional celebrity in the locality which he describes, and in which his presence is turned to such good account. The *sanitarium* referred to is hardly to be considered a *terra incognita*; but the highlands amid which it is situated have constituted a theme of general rather than of minute exposition, especially for more recent geographers and travellers. If we go back beyond a hundred years, we shall find in M. Gmelin (to mention one name only) much that is instructive and interesting about the mountains of Gilan, whether it relates to products or people; and the subject is, at the present day, by no means exhausted.

Dr. Sven Hedin's Journey between the Yarkand and Khotan Rivers.—Through the kindness of General Venukoff, we have again been favoured with an extract from a letter of Dr. Sven Hedin, written to M. Petrovsky, the Russian consul at Kashgar, and dated "Buksem, Khotan-daria, May 22, 1895" (Buksam of the Society's map of Tibet). In crossing the desert between the Yarkand and Khotan rivers, which he was preparing to do at the date of his former letter (*ante*, p. 78), the traveller encountered great hardships from want of water, especially in the last part of the route, between the Mazar Tag and the Khotan river. The caravan was lost among the shifting sandhills, not a vestige of solid rock being seen. Four camels were lost, and many of the men were left *en route* unable to proceed, Dr. Hedin pushing on, and, after three terrible days, arriving on the fourth at the forests along the Khotan river. His companion, Kassim, was in an almost dying condition. Water was obtained by digging in the bed of the stream, and Dr. Hedin then made his way alone to Khotan, subsequently meeting his two companions and, fortunately, finding also the camel with his instruments. He afterwards started for Aksu, whence it was his intention to return to Kashgar.

Journey of Madame Massieu in Central Asia.—We also learn, through M. Venukoff, that this lady, who has lately been studying the ethnology of British India, plans to return to France through Central Asia, in order to become acquainted with the inhabitants of Turkistan. She proposes to travel either *viâ* Ladak, Karakoram, Kilian, and Kashgar, or *viâ* Gilgit, Hunza Aksu, Maral-bashi, and Kara-kul, according as permission is granted by the Indian government, proceeding finally by Osh, Samarkand, and Tiflis.

AFRICA.

The French Expedition in the Hinterland of Dahomey.—Details of the expedition under Commandant Decœur, to which reference was made in our last number, have been published in the *Bulletin* of the French African Association for July. From Carnotville, which served as the base for the replenishment of supplies, after a preliminary excursion in the district of the King of Gambari (capital Paraku), with whom a treaty was signed, a visit was made to Nikki, which was

reached on November 25, 1894, Captain Lugard having been there early in the same month. Having been told that the English had concluded no treaty, Commandant Decœur is stated to have persuaded the king to accept the French Protectorate. From Maka, the point of departure of the caravan route to Gomba and the Niger, Lieut. Band was sent direct to Say, in order to anticipate the Germans, arriving there on February 1. Meanwhile the main expedition proceeded to Pama, the chief of which is stated to have owned allegiance to the King of Gurma. The advance party of the German expedition under Lieut. de Carnap had preceded it here, but, hastening to the capital of Gurma, the French commander reports that he concluded a treaty with the king, placing the whole country under French protection. He then joined Lieut. Band at Say, and apparently preceded the Germans on the way southwards to Gomba, exploring the country along the banks of the Niger. There seems, however, to be some confusion in the dates given, for both Lieut. Band and chief are stated to have arrived at Say on February 1.

Surveys in German Africa.—Astronomical observations, which, though not fulfilling all the requirements now being laid down for the mapping of Africa, are at any rate a contribution towards a better knowledge of the topography of that continent, continue to be made by the Germans in their various spheres of influence, and are published from time to time in the *Mitteilungen aus den Deutschen Schutzgebieten*. The second part of the volume for the present year contains the results of the observations made by Dr. Gruner (who has since become known for his successful explorations in the Niger basin) in 1894, those obtained in 1892 and 1893 having been already published in the last volume of that publication. According to Dr. Fritz Cohn, by whom the results have been calculated, the latitudes obtained attain a high degree of accuracy. That of the station of Misahöhe, derived from the mean of several observations, differing very slightly from each other, is given as 6° 56′ 91″ N. The longitude obtained for the same station by means of meridian distances, starting from Lome as a base, was 0° 41′ east of Greenwich, and a small number of longitudes of other places were obtained by the same method. The same part of the *Mitteilungen* contains latitudes observed by Dr. Stuhlmann in East Africa in 1894, principally on the coast between Dar-es-Salâm and Bagamoyo, as well as a large-scale map of German Kondeland, constructed by Dr. R. Kiepert, chiefly from the surveys of Captain H. Ramsay and the missionaries Neyer and Merensky. The important series of observations made by Captain Ramsay during the Nyasa expedition of 1893–94 were published in the *Mitteilungen* for last year (pp. 71, 78, 235), together with a large-scale map in four sheets constructed by Dr. Kiepert, while the same volume contains observations of positions on the route to the Victoria Nyanza *viâ* Tabora by Joseph Rindermann in 1892, and those made by Father Schynse west of that lake in 1891. Finally, a useful map of the coast region of the Cameroons, from the latest surveys, has been given in Part i. of the same publication for the present year.

The Sesse Islands, Victoria Nyanza.—Although so many travellers have passed near these islands in their voyages on the Victoria lake, they had never been examined minutely until 1893, when Father Brard was sent to inquire into the number and position of the Catholic inhabitants of the group. A short note based on a communication from him appears in the July number of *Petermann's Mitteilungen* accompanied by a map. Sesse proper, the principal island of the group, has a very irregular outline, being deeply indented by bays, which fact accounts for the uncertainty which long prevailed as to the number of units in the group. In spite of the havoc caused by the civil war, Sesse has still a population of 15,000 souls, ruled over by two chiefs. The inhabitants are hardy sailors. The island is divided into two parts by a depression only 3 to 6 feet above the level of the lake, across which canoes are dragged from one side to the other by the Basesse.

Dr. Stuhlmann's Collection in Ulunguru.—Dr. Stuhlmann, who, though primarily a zoologist, succeeded, during his expedition with Emin Pasha, in bringing together a valuable botanical collection, has lately sent another such collection, made during his journey to Ulunguru, September to December, 1894, to the Royal Botanic Museum in Berlin. He has, as far as possible, paid attention also to the conditions of the habitat and the characteristics of soil and mode of life of the various plants. It appears that Ulunguru resembles Usambara in the richness of the vegetation, and suitability for systematic cultivation (*Deutsches Koloniablatt*, 1895, p. 296).

Captain Gillain on the Country between the Sankuru and the Lomami.—This officer, who was one of those attached to Baron Dhanis' expedition in 1892–94, has lately traversed the country lying between the upper courses of the Sankuru and Lomami, and supplies (*Mouvement Géographique*, 1895, No. 12) some account of the physical features of the region, which had in part been previously traversed by Delcommune and Bia. South of Lupungu's stronghold at Kabinda (visited by Dhanis and Hinde), near the sources of the Lurimbi, a mountain *massif* runs to the south-south-west, containing the sources of many streams flowing to the Sankuru, Lomami, and Lukassi. Further south, on the upper Luembe (tributary of the Sankuru), the rock everywhere crops out on the surface, forming vast agglomerations of blocks, resembling enormous monoliths. The river is much broken by rapids. The water-parting between the Luembe and Lomami is but slightly marked, and consists of a broad plateau. The Lomami flows in great part through a swampy plain, very difficult to cross, and Captain Gillain considers that most of the region between the Luembe valley and the Lomami has the same character. The water-parting between the Lomami and the Lualaba is formed by a line of gently rising wooded heights, a triangular plateau with isolated summits extending into the basin of the Lovoi. It is well wooded, especially towards the south, and is rich in caoutchouc.

The Congo Railway.—Recent despatches received in Brussels (*Mouvement Géographique*, 1895, No. 15) give a favourable account of the progress made on the Congo railway during the past year. Since the end of May last, the line has advanced beyond the hundredth kilometre, whereas on the 15th of the same month, in 1894, only the fifty-second kilometre had been reached. On June 17 the second section, as far as the station of Lufu (82·5 kilometres), was opened for traffic, and the monthly receipts have since risen from 11,000 to 39,000 francs, a sum which is likely soon to be exceeded, as the station of Lufu will not long remain the terminus of traffic. The health returns have been satisfactory during the past year.

Morocco or Marocco.—While the Arabic name Marraksh or Marrakesh ("the adorned"), applied to one of the capitals of the western kingdom of Barbary, was written by the Spaniards Maruecos, by the Italians Marocco, by the French Maroc, and by the Germans Marokko, the first vowel has in English been more frequently changed into *o*, no doubt owing to the slight distinction in the sound of the two letters when slurred over in the characteristic English fashion, and to the connection supposed to exist between the name of the country and the "Moors." Count Gleichen writes to us urging that an effort should be made for the adoption of the more correct spelling "Marocco," which has already been used to some extent in English publications. Indeed, this form is found in the sixteenth century, in 'Hakluyt's Voyages;' but during the next two centuries the other form seems to have come into fashion, being found in Addison's 'West Barbary' (1671), in Simon Ockley's 'Account of South-West Barbary' (1713), in the 'Geographical Dictionary' published by J. Coote (2 vols. folio) in 1759–60, and in other works. During the present century both forms have been largely used. Richardson ('Travels,' etc., 1860) still writes Morocco, though he gives

the Arabic form as Maraksh (not Moraksh, as is stated in Egli's 'Nomina Geographica'). The more correct spelling is used by Hooker and Ball, by Lieut.-Colonel Trotter, and also in Stanford's 'Compendium,' and other recent works, though the form Morocco still holds its own in popular usage. It certainly seems desirable that Count Gleichen's suggestion should be adopted.

M. Gautier's Explorations in Madagascar.—In the fourth volume of the *Journal* (p. 565) we gave some account of M. Gautier's explorations in the west of Madagascar down to the beginning of 1894. That traveller has since returned to France, and has given before the Paris Geographical Society (*Comptes Rendus*, 1895, pp. 106 *et seq.*) a general account of his explorations during the past three years, including his journeys in the extreme south-west of the island in the latter part of 1894. The tribes in this region (five in number) are quite independent of the Hovas, and are equally important with the Sakalavas, though much less known. The Baras are mountaineers, and do not reach the coast at any point. Small Hova traders bring them the goods of which they have need, and the Hova influence is thus gradually extending among them. They are great brigands. The Antanosy, among whom Fort Dauphin was founded in the seventeenth century, are the most intelligent, and the Antandroy and Mahafaly the most exclusive in Madagascar. The greater part of the territory of the Antandroy is occupied by an enormous basaltic system, formed by a vast horseshoe basin with a basaltic table-land in the centre. The vegetation is very scanty owing to the dry southerly winds, and has quite a special character. M. Gautier has also contributed a paper on the physical geography of the west of Madagascar to the *Annales de Géographie* (1895, No. 4), accompanied by a valuable hypsometrical map of the island, in which the points of orography brought to light by his explorations are shown.

A New Coffee-Parasite in East Africa.—Since the year 1893 a new coffee-parasite has appeared in German East Africa, having been first observed in the small plantation of the Mission Station at Morogoro. Dr. O. Warburg gives a short account of its life-history and of the measures to be adopted for its destruction in the *Mitteilungen a. d. Deutschen Schutzgebieten* (1895, p. 130), with a plate showing its various stages. To which class of beetles it belongs is still uncertain, but it has been ascribed to the genus *Herpetophygas*, of which the only species hitherto known is found in Kaffraria. It must therefore be indigenous to tropical Africa, and to it must probably be attributed the damage done to coffee plantations in various other parts of the continent. The length of the full-grown beetle is one inch. The larva bores longitudinal passages in the young thin branches, with occasional openings to the surface, but in the lower parts of the shrub it attacks chiefly the cambium layer, and in this way soon causes the destruction of the plant. Dr. Warburg considers that with suitable precautions the destruction of this pest in the plantations should not be difficult, and especially recommends the destruction of the young larvæ in the borings by means of petroleum or sulphide of carbon, the openings to the air, which occur in regular rows, offering special facilities for the application of these liquids by means of an oil-can with fine tube. As also the ant known as *Odontomachus hæmatodes* has been found on the attacked shrubs, it is possible that it may prey upon the larvæ, and so become a valuable ally in the work of extermination. In newly cleared portions of forest it is important to remove any decaying wood, etc., which might harbour the parasite. In connection with this subject, it may be noticed that a most favourable report has been given as to the results of the introduction of West Indian coffee into the Cameroons, the produce resembling the true Mocha sort, and possessing a full and excellent flavour (*Deutsches Kolonialblatt*, 1895, p. 354).

Sijilmásiyah.—In Major Raverty's letter on "Sijilmásiyah and Tafilet," in

the August number of the *Journal*, the printer has reversed the two last Arabic words, which were correct in the proof. That on p. 189 should be فاس, and that on p. 190 عامرة.

AMERICA.

The Sources of the Mississippi.—When the boundaries between the newly recognized United States and the remaining British territory in North America were first arranged, a part of the frontier was formed by a line drawn from the north-western point of the Lake of the Woods, "on a due west course to the river Mississippi." The Mitchell map (1755), which was consulted by the plenipotentiaries in drawing up the treaty, showed the Lake of the Woods as the upper St. Lawrence, and noted that the head of the Mississippi was probably about the fiftieth degree of latitude and the western bounds of the map. At that time no white man was known to have visited the source of the Mississippi, the region attracting neither trader nor missionary. Even the red men did not know the district well, as it was in that intermediate region between tribal lands known as "the road of war." In 1804 William Morrison was stationed at a trading outpost, and visited a lake called Omoskos Sogiagon by the Ojibways, which thereafter became known by the English equivalent Lake Elk. The name may be derived from the shape of the lake, a head with two horns, or from the elk remains found there. In old French maps the name Lac la Biche occurs, but there is no record of how the information about it was obtained by them. The first accurate information we have is from H. R. Schoolcraft, a geologist and mineralogist, who had accompanied General Cass on an unsuccessful attempt to reach the source of the Mississippi in 1820, but had indicated a Lake Labeish on the map he published. He was commissioned to return to the region, and in 1832, accompanied by Lieut. Allen and two others, he was guided up the Mississippi by an Ojibway named Ozawindib, to the Elk lake, where he remained a day, hoisted the stars and stripes, and named the lake Itasca (*Veritas Caput*, with the first and last syllables removed), the true head of the great river. Jean Nicollet was the next to survey the lake, and he saw in a stream, flowing into its western branch, which he traced through the lakes, the "Infant Mississippi." Somewhat to the east of this he showed a deep bay of the lake which in later times seems to have been cut off from the main lake, owing to the fall of the water-level. Julius Chambers saw this lake in 1872, after dragging his canoe along a shallow creek for a third of a mile, and considered it the source of the river. To this small lake the old name of Elk lake was given by the State Survey of 1875, since the larger body of water, since Schoolcraft's day, had been known as Lake Itasca. At least other three Europeans visited this lake before W. Glazier did so in 1881, named it Lake Glazier, asserted it formed the headwaters of the Mississippi, and claimed to be their discoverer. He sent a letter and a map to the Royal Geographical Society, announcing his "discoveries," which were published in January, 1885, but the validity of the "discoveries" was questioned in later numbers of the *Proceedings*. Mr. Glazier wrote a book, 'Down the Great River,' which was severely criticized. The amount of controversy raised by Mr. Glazier's book led the Historical Society, and ultimately the State of Minnesota, to institute a special survey under the direction of the Honourable J. V. Brower, who was also appointed Commissioner of the 35 square miles round the sources of the Mississippi, which the State legislature set aside as a "permanent park reservation." This Mr. Brower has done,* and has shown that Nicollet's "Infant

* 'The Mississippi River and its Source: a Narrative and Critical History of the River and its Headwaters, accompanied by the Results of Detailed Hydrographic and Topographic Surveys.' By Hon. J. V. Brower, Commissioner of the Itasca State Park, Minneapolis, Minn. Harrison & Smith, 1893.

Mississippi is truly so called, while there exists a secondary supply of water flowing into the other branch of Lake Itasca. As to Elk lake when the waters of Lake Itasca were very high in 1890, it was really lower than the larger sheet of water, although usually Elk lake is about a foot above it, and its waters flow into it by a shallow creek. On tracing the Infant Mississippi, two lakelets were found, but the waters of the last were supplied from plentiful springs, which rise just below the end of a third lakelet Nicollet's upper lake), which in turn receives water that has come through other and higher lakelets. Beyond these again, and higher up, Mr. Brower discovered other lakelets, without surface outlets; but, as the water is constantly bubbling up at the foot of the slight hills, formed of old moraines, they are the ultimate reservoirs collecting the waters which flow continuously from the Mississippi springs to the Gulf of Mexico. The length from the mouth of the river to the furthest of the lakes, which lies 1558 feet above the sea-level, is 2555¼ miles; to the Mississippi springs (1535 feet), 2547 miles; and to Lake Itasca, 2546½ miles, which place is 1457 feet above the level of the sea. The average fall of the river is thus about 7¼ inches per mile.

German and Italian Colonies in the South of Brazil.—A Foreign Office report by Mr. Walter R. Hearn, lately published (Miscellaneous Series, No. 367), contains the account of a visit made by him to the German and Italian colonies in the valley of the river Cahy, in the state of Rio Grande do Sul, during the autumn of last year. The particulars given as to the progress, present condition, and prospects of the colonies of the two nations are valuable, in view of the small amount of information available respecting them. Starting from Porto Alegre, the river Cahy was ascended by paddle-steamer as far as São Sebastião, the principal centre of the German colonies in that direction, and the limit of navigation by the barges or paddle-wheel steamers in which the colonial produce is brought down. Beyond this point, a road made by Government about seventeen years ago leads to Caxias, the centre of the Italian colonies (55 miles further); but, being merely a broad cleared track, it becomes almost impassable in rainy weather. It passes through well-cultivated fields alternating with patches of forest, and in spite of its bad condition, a very extensive traffic, both by waggons and mules, passes along it. Among the productions of the country are mentioned silkworms, beeswax, wine, and oranges, from which last a very pure, mild spirit is distilled. As the road ascends to the hill country, valuable forests of pine (*Araucaria braziliana*—Lamb) are reached. The town of Caxias is 2600 feet above sea-level, and has better houses and streets than any of the German towns. Although nearly all the Italian colonists were derived from the very poorest class, and wholly devoid of capital, they have shown much energy. Flour-mills and saw-mills have been constructed, and the land is well ploughed and planted, though here, as in the older German colonies, greater agricultural knowledge and improved appliances are much needed, as well as the opening up of means of communication with the markets. The Germans, though less energetic, are said to be more plodding than the Italians, and more inclined to settle down as permanent citizens. The great desideratum is a railway to Caxias, which might consist of a continuation of the existing branch line to New Hamburg, and as the history of the latter, which is itself fed solely by the colonies, is one of uninterrupted progress, there can be no doubt as to the success of such an extension.

POLAR REGIONS.

Mr. H. J. Pearson's Expedition to Novaya Zemlya.—This expedition, which left England in the end of May, with the intention of visiting Novaya Zemlya, returned to England on August 12. The members of the party were

Mr. H. J. Pearson, Mr. C. E. Pearson, the Rev. H. H. Slater, and Colonel Feilden. Leaving Vardö in the steam-yacht *Saxon* on June 14, a course was laid for Nameless Bay, in the north-west of Novaya Zemlya (proper). The ice conditions in Barents Sea were found to be extremely unfavourable. Impenetrable pack was met about 80 miles from the west coast of Novaya Zemlya, trending towards the north-west, and several days were spent in cruising along the edge of this heavy ice to the south-east. Every likely bight in the pack was entered, and in some cases these indentations were followed for 20 to 30 miles, but invariably heavy polar ice barred the way, and the yacht had to return to open water. Coal running short, the vessel bore up for Vardö to refill. The members of the expedition were landed on the Murman coast of Russian Lapland, near Svatoi Nos, where they went into camp. A week was spent there profitably, in ornithological, botanical, and geological investigations. On the return of the yacht from Vardö, a second attempt was made to reach Novaya Zemlya. The pack was again met with in about the same meridian as before, but a fortunate lead showing, the vessel ran some 40 miles through the pack, and found a large space of open water about the centre of Goose Land. Unfortunately, a dense impenetrable pack of 8 to 10 miles in width was jammed against the shore, and connecting with the main pack off North and South Goose Capes; in fact, the vessel lay in a large water-hole. An attempt was made to press the yacht towards North Goose Cape, in the hope of open water being found in the direction of Möller Bay, which resulted in the little vessel being nearly beset in the pack, but eventually the large pool of open water off Goose Land was regained. The wind now shifted to the south-east, and the lead by which the yacht had entered closed entirely. The pack came up from the direction of Meodusharsky Island, and hour by hour the water-pool contracted. Again coal had begun to run short, when fortunately a good lead opened to the south-west; a run was made for it, and, after passing through 40 miles of dense pack on either side, open water was reached, the yacht running down to the island of Kolguev with the ice in sight all the way on her port side. A landing was effected on Kolguev on July 5, and the members of the expedition went into camp near the mouth of the Kriva river, on the south-west side of Kolguev. The *Saxon* returned from Vardö and took the party off on July 16. Good results were obtained on Kolguev in various branches of natural history, and a series of interesting photographs were taken. During the stay of the party on Kolguev the weather was very bad, the temperature seldom rising above 35° Fahr., with fogs, and bitter cold winds from north and north-west; part of the time the pack came down and girdled the west side of the island. Kolguev was left on July 16, and a third attempt was made to reach Novaya Zemlya. A marvellous change had occurred in the conditions of the ice. The impenetrable pack which a fortnight previously stretched from Kolguev to Novaya Zemlya had altogether disappeared, and the *Saxon* reached Kostin Shar on the evening of July 17, without encountering a piece of ice worth mentioning. Stoppages of some days were made at several anchorages in Kostin Shar, notably in Nechwatowa Bay, the final anchorage being at the head of Belucha Bay, near South Goose Cape. The Samoyede settlement in that locality was visited. A considerable river not marked in the charts, which enters the north-east of Belucha Bay, was explored. The *Saxon* returned to Vardö on July 30, after an interesting and adventurous voyage.

Captain Wiggins's Expedition to the Yenisei River.—Captain Wiggins started from the Tyne for Golchika, at the mouth of the Yenisei, on August 12. His vessels are the *Lorna Doone* and the *Burnoul*, and they are taking out a miscellaneous cargo, which is to be exchanged at Golchika for some hundreds of tons of graphite. The expedition, as we understand, is mainly at the cost of Mr.

Leybourne Popham, whose vessel, the *Stjernen*, was lost through fog and untoward currents at the mouth of the Yugor Shar last year. This, however, was a mishap that could in no way be attributed to ice; so it is very satisfactory to see that it has not deterred Mr. Popham from coming forward again as a supporter of the Kara Sea route to Siberia. It is curious to read of bicycles and quantities of barrels of salted herrings as forming part of the cargo of "notions" destined for the hyperborean dwellers of the Yenisei valley.

OBITUARY.

Sir Thomas Wade, K.C.B., G.C.M.G.

Sir Thomas Francis Wade, whose death at Cambridge, at the age of seventy-seven years, has been announced, had been a Fellow of the Society since 1863, and had served on the Council between 1885 and 1888. Although not primarily a geographer, he took a warm interest in the proceedings of the Society, and often took part in the discussions on papers relating to China and neighbouring countries. It is in connection with our diplomatic relations with the Chinese Empire, and as a student of Chinese literature, that his name is best known, and during the long period of his service in the East there were few important negotiations in which he did not in some way or another take part. Elder son of Sir Thomas Wade, C.B., he was born in 1818, and, after receiving his education at Harrow, entered the army as ensign in the 81st Foot, subsequently serving in the 42nd Highlanders and (as lieutenant) in the 98th Foot, his first service in China taking place in 1842. He became interpreter to the garrison at Hong Kong (1843), assistant Chinese secretary (1847), and, after having been transferred to Shanghai as vice-consul in 1852, returned as Chinese secretary in 1855, and was soon after sent by Sir J. Bowring on a special mission to Cochin China. His acquaintance with the Chinese language and people led to his employment under Lord Elgin during his mission to China, and in 1861 he was made a C.B. in recognition of his services. He was made Chinese secretary and translator to the British Legation in 1863, and after twice acting as Chargé d'Affaires in Peking, became in 1871 envoy extraordinary and minister plenipotentiary, and chief superintendent of British trade in China. While holding this important post, he did valuable service by his negotiations in the interests of British trade in China. He also benefited geographical science by the warm interest which he took in the mission of Mr. Margary and the journey of Captain Gill, and after the murder of the former his untiring zeal led to the conclusion of the celebrated Chi-fu convention. He retired on a pension in 1883. Sir Thomas Wade was essentially a man of study, and in this respect a contrast has been drawn between him and Sir Harry Parkes, who took an equally important part in Chinese politics, the latter being described as more a man of action. Sir Thomas Wade published in 1867 the 'Tzü-Erh Chi' (Progressive course), treating of the Chinese language both colloquial and written. He formed a most valuable collection of Chinese works, which he presented in 1887 to the library of the Cambridge University, in which he was appointed first professor of Chinese in 1888. He used to urge on geographers the importance of a study of Chinese works in the interests of their science, holding that as much could be done in this way to throw light on the topography of remote parts of the empire as by renewed explorations. He was made K.C.B. in 1875, and G.C.M.G. in 1889. He married, in 1868, Amelia, daughter of Sir John Herschel.

Joseph Thomson.

By E. G. Ravenstein.

On August 2 there died, at the residence of his friend Mr. S. W. Silver, and after a long and painful illness, Joseph Thomson, whose name will for ever rank foremost among those who, in the second half of the nineteenth century, have revealed to us the geographical secrets of Central Africa, and paved the way for its ultimate civilization. Joseph Thomson was born on February 14, 1858, at Penpont, a small

JOSEPH THOMSON.

village near Thornhill, in Dumfriesshire, the youngest of the five sons of Mr. William Thomson, who survives him. Early in life the late Dr. Grierson instilled him with a love of natural science, and subsequently he profited much from Sir Archibald Geikie's lectures on geology, which he attended.

In 1878 the Royal Geographical Society organized an expedition for the exploration of the Central African lakes. Mr. Keith Johnston, a geographer of distinction, was appointed its leader, and Mr. Thomson, who describes himself at that time as an "unskilful youth," was selected to accompany him as geologist. The expedition left Zanzibar in January, 1879. On June 28, its leader succumbed to dysentery at Behobeho. Thomson proved equal to the trying position in which he was placed, and at once resolved to carry out the objects for which the expedition had been fitted out. This bold resolve—bold in a youth of twenty-one—was crowned with complete success. Thomson was the first to reach the Nyasa from the north; he

crossed the plateau separating that lake from Tanganyika, followed the western shore of the latter to its outlet the Lukuga, examined that river for a distance of 60 miles, and ultimately found himself within a short distance of the upper Congo, or Lualaba, when his progress was stopped by a chief of Urua, and he was reluctantly compelled to retrace his steps. On his return journey to the coast Thomson visited Lake Rukwa, or Leopold. In June, 1880, he was back at Zanzibar. This expedition not only yielded valuable topographical details, but also the first precise notions of the geological structure of Eastern Africa.*

Almost immediately after his return, Thomson started on a second expedition. Coal had been reported to exist on the Lujenda, the southern source-river of the Rovuma. The Sultan of Zanzibar was anxious for fuller information, and entrusted the rising young explorer with the task of ascertaining the facts. Thomson started from Mikindani in July 13, 1881, and spent three months on this expedition. The "coal," unfortunately, turned out to be merely bituminous shale, and Thomson lost the favour of his employer.†

Scarcely had he returned to his native land, when he was offered the leadership of an expedition which the Royal Geographical Society intended to despatch into the country of the Masai. At that time only a few Europeans had come into contact with this fierce pastoral tribe, the interior of whose country was still absolutely untrodden except by Swahili caravans starting from Pangani or Mombasa. Dr. G. A. Fischer anticipated some of Thomson's discoveries. Having left Pangani in December, 1882, he succeeded in reaching Lake Naiwasha, where his further progress was stopped by the hostility of the natives. This happened in June. Thomson started from Rabai, near Mombasa, on March 15, 1883. After a rush up Kilimanjaro, which he climbed to a height of 9000 feet, he attempted to pass to the west of that mountain. But Dr. Fischer had been fighting there, and Thomson, who was anxious on all occasions to avoid hostilities with the natives, turned back. Having replenished his supplies, he left Rabai for the second time on July 17. He now passed to the east of Kilimanjaro; reached Naiwasha on September 29; crossed the Laikipia plateau to within a short distance of Mount Kenya; explored Lake Baringo, which turned out to be a comparatively small sheet of water; and ultimately, on November 12, stood at the north-eastern extremity of the Victoria Nyanza, in Kavirondo. On his return to the coast, he visited the cave-dwellers on Mount Elgon. On May 27, 1884, he was back at Rabai. ‡

The results of this expedition were of the first importance, and the thoroughness of his work as a geological pioneer has been ungrudgingly recognized by his successors. The Royal Geographical Society, fully conscious of the excellent services rendered by him, awarded him their Founder's medal (*Proc. R.G.S.*, 1885, p. 474).

In 1885 Thomson was despatched to Sokoto on a diplomatic mission, which he accomplished to the full satisfaction of his employers, the predecessors of the Royal Niger Company. The treaties negotiated by him with the Sultan of Sokoto and other chiefs in the Central Sudan, have enabled England to claim extensive regions in the Niger-Benue basin as lying within the British "sphere." §

In 1885 Thomson, accompanied by Lieut. Harold Crichton-Browne, paid a short visit to Morocco. He twice crossed the Atlas, and although he failed in his

* See 'To the Central African Lakes and Back,' 2 vols. (London: Sampson Low, 1881); and *Proceedings R.G.S.*, 1880, pp. 721–742.

† "Notes on the Basin of the River Rovuma," in *Proceedings R.G.S.*, 1882, pp. 65–79.

‡ 'Through Masai-Land' (London: Sampson Low, 1885); *Proceedings R.G.S.*, 1884, pp. 690–712.

§ See a paper read before the British Association, *Proceedings R.G.S.*, 1886, p. 735.

attempts to penetrate into Wadi Draa and Sus, he considerably enlarged our knowledge of the region explored by him.*

About this time Thomson was offered a lucrative appointment at home. His mind, however, was still fixed upon Africa, and having published a brightly written 'Life of Mungo Park' (Philip and Son, 1890), he gladly embraced an opportunity for exploring the northern portion of British Central Africa which was afforded him by Mr. Rhodes. He travelled up the Zambezi and Shire to Nyasa, and on August 23, 1890, accompanied by Mr. T. A. Grant, a son of the late Colonel Grant, he left Kotakota on the western shore of that lake, and traversed the country as far as Lake Bangweolo. On January 4, 1891, he was once more at Kotakota.† He returned, however, broken in health. A prolonged treatment in Edinburgh and London proving of no avail, he went out once more to South Africa, in search of health, staying for some time at Kimberley, the honoured guest of Mr. Rhodes. He unfortunately returned home before the beneficial effects of the climate had had a chance of ameliorating his condition; an attack of influenza supervened, and he died at the early age of thirty-seven.

Thomson was of a lovable nature. Cheerful, modest, unselfish, and forbearing, he made numerous friends. As an explorer he possessed remarkable qualifications. At a glance he was able to grasp and map the features of the countries he traversed. He never lost sight of the object he had in view, but although by no means deficient in personal bravery, he sought to overcome resistance rather by an exercise of patience than by violence. He was one of the few among our great African explorers who could boast that he never shed a drop of native blood, not even in self-defence.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.	**Mag. = Magazine.**
Ann. = Annals, Annales, Annalen.	**P. = Proceedings.**
B. = Bulletin, Bollettino, Boletim.	**R. = Royal.**
Com. = Commerce, Commercial.	**Rev. = Review, Revue, Revista.**
C. R. = Comptes Rendus.	**S. = Society, Société, Selskab.**
Erdk. = Erdkunde.	**Sitzb. = Sitzungsbericht.**
G. = Geography, Geographie, Geografia.	**T. = Transactions.**
Ges. = Gesellschaft.	**V. = Verein.**
I. = Institute, Institution.	**Verh. = Verhandlungen.**
J. = Journal.	**W. = Wissenschaft, and compounds.**
M. = Mitteilungen.	**Z. = Zeitschrift.**

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Ægean Sea. *Globus* **67** (1895): 309–314. **Schott.**

Das Ägäische Meer. Ein Beitrag zur Hydrographie desselben von Dr. Gerhard Schott. Hamburg. *With Maps.*

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* 'Travels in the Atlas and Southern Morocco' (London: Philip and Son, 1889); and *Proceedings R.G.S.*, 1889, p. 1.

† "To Lake Bangweolo and the Unexplored Region of British Central Africa," in the *Geographical Journal*, i., 1893, pp. 97–121.

Austrian Alps. *M.G. Ges. Wien* **38** (1895): 207–226. **Schönberger.**

Orometrisches aus den Niederen Tauern. Von Franz Schönberger, Professor in Brünn. *With Diagram.*

Balkan Peninsula—Montenegro and Albania. **Cozens-Hardy.**
Alpine J. **17** (1895): 405–419.

The Mountains of Montenegro and Albania. By W. H. Cozens-Hardy. *With Map.*

Danube. **Fugger and Kastner.**

Donau-Studien. Nach dem Plane und den Instructionen von Dr. Jos. Ritter v. Lorenz-Liburnau. Dritte Abhandlung. Die Geschiebe des Donaugebietes. I Die Geschiebe der Salzach von Prof. Eberhard Fugger und Prof. Karl Kastner in Salzburg. Beilage zu Band XXXVIII. (1895) der 'Mittheilungen.' Wien, 1895. Size 9½ × 6½, pp. 148. [Bound up with 'Mittheilungen' 38 (1895). No. 2.]

England, Climate of South Coast. **Black.**

Meteorology, Seaside, English Channel—Winter. By W. G. Black. *With Four Plates.* Reprinted from the *Transactions* of the Royal Scottish Society of Arts. [Read before the Society, February 13, 1893.] Size 9 × 6, pp. [12.]

European Glacial Deposits. *J. Geology* **3** (1895): 241–269. **Geikie.**

The Classification of European Glacial Deposits. By James Geikie.

France—Gold-deposits. *B.S. Languedoc. G.* **17** (1894): 285–326. **Viala.**

Les Gisements d'or en France considérés dans leurs rapports d'origine et de richesse avec les autres gisements aurifères. Par L.-Fernand Viala.

France—Herault. *B.S. Languedoc. G.* **17** (1894): 350–386, 472–509. **Laponge.**

Matériaux pour la Géographie anthropologique du département de l'Hérault. Par M. G. De Laponge.

France—Northern Coal Basin. *B. Union G. Nord France* **15** (1894): 216–240. **Gilles.**

Le bassin houiller du Nord et du Pas-de-Calais. Par M. Gilles.

France—Vosges Lakes. *B.S.G. Paris* (7) **15** (1894): 557–604. **Thoulet.**

Contribution à l'étude des lacs des Vosges. Par M. J. Thoulet. *With Illustrations.*

Germany—Bavaria. **Fels.**

Bruckmann's Illustrated Guides. The Highlands of Bavaria, with Salzburg and the Adjacent Parts of the Tyrol. By Dr. Gsell Fels. Translated by J. Albert Swallow. With Views, a Map of the Environs, a Plan of the City, and a large Tourist's Map. Munich: A. Bruckmann, 1895. Size 6½ × 4½, pp. xii., xvi., and 238. *Price* 2.50 *marks. Presented by Messrs. Asher & Co.*

Germany—Bavaria—Munich. **Fels.**

Bruckmann's Illustrated Guides. Munich. By Dr. Gsell Fels. With Views, a Map of the Environs, and a Plan of the City. Munich: A. Bruckmann, 1895. Size 6½ × 4½, pp. xvi. and 64. *Price* 1 *mark. Presented by Messrs. Asher & Co.*

A clearly written guide of convenient size, with serviceable maps.

Germany—Kiel Canal. **Beseke.**

Der Nord-Ostsee-Kanal. Seine Entstehungsgeschichte, sein Bau und seine Bedeutung in wirthschaftlicher und militärischer Hinsicht. Von C. Beseke. Kiel & Leipzig: Lipsius & Tischer, 1893. Size 9½ × 6½, pp. viii. and 148. *Maps and Plans.*

This work discusses the military and commercial conditions of the new canal, and, amongst others, contains a remarkable map of the shipwrecks which have taken place round the coast of Jutland.

Germany—Kiel Canal. ———

'Nord-Ostsee-Kanal-Nummer' 'Illustrirte Zeitung.' Leipzig and Berlin, 15 June, 1895. Size 16½ × 11½, pp. [19]. *Maps and Illustrations (including Panorama).*

Special number of the *Illustrirte Zeitung*, with illustrations of the Kiel Canal.

Germany—Kiel Canal. *J.R. United Service I.* **39** (1895): 623–633. ———

North Sea and Baltic Canal. *With Map, Plans, etc.*

A short account, with plans and sections.

Germany—Poland. **Auerbach.**

Un problème de Colonisation Intérieure, La Germanisation de la Pologne Prussienne. Par Bertrand Auerbach. Annales de l'École Libre des Sci. Politiques. X. Année, No. 2, 15 Mars, 1895. Extrait. Paris: F. Alcan, 1895. Size 10 × 6½, pp. [16]. *Presented by the Author.*

Greece. *Z. Ges. Erdk. Berlin* **30** (1895): 135–226. **Philippson.**

Reisen und Forschungen in Nord-Griechenland. Von Dr. Alfred Philippson. I. Teil. *With Maps and Profiles.*

Germany—Longitudes. ———

Veröffentlichung des Königl. Preussischen Geodätischen Institutes. Astronomisch-Geodätische Arbeiten. I. Ordnung. Telegraphische Längenbestimmungen in den Jahren 1890, 1891, und 1893. Berlin: P. Stankiewicz, 1895. Size 12 × 9, pp. vi. and 242.

The telegraphic longitude determinations treated of in this volume are Springberg-Schönsee, Berlin-Springberg, Berlin-Potsdam, and Ubasberg-Göttingen; Ubasberg-Bonn; Bonn-Göttingen.

Italy—San Marino. *B.S.R. Belge G.* **19** (1895): 135–160. **Hauttecœur.**

La république de San Marino. Par H. Hauttecœur.

Italy—Venice. **Primo.**

Lanzoni Primo. Il Porto di Venezia. Venezia: Carlo Ferrari, 1895. Size 12 × 9, pp. 50. *Plans.*

A description, with somewhat roughly sketched maps, of the Venice of to-day; to be followed by an account of the historical changes in the port of Venice.

Mediterranean Tour. ———

A Cruise to Morocco, Balearic Isles, South of France, Italy, Sicily, Syria, Palestine, Egypt, Algeria, etc., by the Orient Company's s.s. *Garonne*, February 20, 1895. Size 10 × 7½, pp. 38. *Map and Illustrations.*

Rhine. *Tijds. Ned. Aard. Genoots. Amsterdam* (2) **12** (1895): 169–182. **Beekman.**

De Rijn van onzen tijd als groote handelsweg. Voordracht gehouden in de Vijf en zeventigste Algemeene Vergadering van het Koninklijk Nederlandsch Aardrijkskundig Genootschap. Door A. A. Beekman.

On the Rhine as a great trade-channel.

Russia. **Voeikoff.**

Meteorologicheskiya Selkokhozyaistvennuiya Nablyudeniya v Rossii v 1892 i 1893 gg. A. I. Voeikoff. [Meteorologico-Agricultural observations in Russia in 1892 and 1893.]—Zapiski Imp. Russ. Geogr. Soc. Gen. Geography, xxix., No. 3. St. Petersburg, 1895. Size 10 × 7, pp. 130. *Presented by the Imperial Russian Geographical Society.*

Russia—Swanetia. *Scottish G. Mag.* **11** (1895): 273–299. **Dingelstedt.**

The Caucasian Highlands: a Physical, Biological, and Ethnographical Sketch of Svanetia. By Victor Dingelstedt.

Russia—Sand-storms. *Rev. Scientifique* (4) **3** (1895): 571–573. ———

Les ouragans de poussière dans la Russié méridionale.

Russia—Tundras. **Jackson.**

The Great Frozen Land (Bolshaia zemelskija Tundra). Narrative of a Winter Journey across the Tundras and a sojourn among the Samoyads. By Frederick George Jackson. Edited from his journals by Arthur Montefiore. London: Macmillan and Co., 1895. Size 9½ × 6½, pp. xviii. and 298. *Map and Illustrations. Price* 15*s. Presented by the Publishers.*

An admirably written record of Mr. Jackson's journey in the Tundras, with a series of appendices, including a description of the outfit of the *Windward*.

Scotland. **Jusserand.**

A Journey to Scotland in 1435. By J. J. Jusserand. From the *Nineteenth Century*, June, 1895. Size 10 × 6½, pp. [17].

Scotland—Railway Guide. **Melven.**

Official Guide. North British Railway. West Highland Railway.

Guide to Scotland. By William Melven. Maps by Bartholomew, and Forty-seven Views from Photographs. Edinburgh: T. C. and E. C. Jack, 1895. Size 7½ × 4½, pp. 200.

Switzerland. **Baedeker.**

Switzerland and the adjacent portions of Italy, Savoy, and Tyrol. Handbook for Travellers. By Karl Baedeker. Sixteenth Edition. With 47 Maps, 12 Plans, and 12 Panoramas. Leipsic: Karl Baedeker, 1895. Size 6½ × 4½, pp. xxx. and 500. *Price* 8 *marks.* *Presented by the Editor.*

Switzerland.

Schweizerisches Ortschaftenverzeichnis. Dictionnaire des Localités de la Suisse. Herausgegeben vom eidg. statistischen Bureau. Publié par le bureau fédéral de statistique. Bern: Orell Füssli, 1895. Size 10 × 6½, pp. 222.

A concise gazetteer of the Swiss communes.

ASIA.

Afghanistan. **McFall.**

With the Zhob Field Force, 1890. By Captain Crawford McFall. London: W. Heinemann, 1895. Size 9½ × 6½, pp. 232. *Illustrations.* *Price* 18*s.*

An interesting account of the expedition to the Zhob valley in 1890–91, with a number of spirited sketches by the author.

Arabia—Mecca. *B.S. normande G.* **17** (1895): 1–9. **Courtellemont.**

Voyage à la Mecque. Par M. Gervais Courtellemont.

The author states that he visited Mecca in order to complete a series of photographic views of Mussulman countries, and he illustrated his lecture with a series of lantern slides of Mecca.

Arabian Sea—Laccadive Islands. **Oldham.**

J. Asiatic S. Bengal **64** (Pt. II.) (1895): 1–14.

Natural History Notes from H.M. Indian Marine Survey Steamer *Investigator*, Commander C. F. Oldham, R.N., commanding. Series II., No. 18. I. The Topography of the Arabian Sea in the Neighbourhood of the Laccadives. II. The Physical Features of some of the Laccadive Islands, with Suggestions as to their Mode of Formation. By Commander C. F. Oldham. *With Plates.*

Asia Minor—Kizil Irmak River. **Flottwell.**

Aus dem Stromgebiet des Qyzyl-Yrmaq (Halys). Von V. Flottwell. [Dr. A. Petermanns Mitteilungen, Ergänzungsheft, Nr. 114.] Gotha: Justus Perthes, 1895. Size 11 × 8, pp. 56. *Map and Plans.*

This important memoir will be referred to in the Monthly Record.

Asia Minor—Phrygia. **Ramsay.**

The Cities and Bishoprics of Phrygia; being an Essay of the Local History of Phrygia from the Earliest times to the Turkish Conquest. By W. M. Ramsay, D.C.L., etc. Vol. I. The Lycos Valley and South-Western Phrygia. Oxford: the Clarendon Press, 1895. Size 10 × 7, pp. xxii. and 352. *Map and Plan.* *Price* 18*s.* *Presented by the Clarendon Press.*

A massive contribution to historical geography which will be specially reviewed.

China. **Werner.**

The China Problem and its Solution. By E. T. C. Werner. From the *Fortnightly Review*, April, 1895. Size 10 × 6½, pp. [13].

China. **Schlegel.**

Problèmes Géographiques. Les peuples étrangers chez les historiens Chinois. XIX. Lieou-Kieou-kouo. Le Pays de Lieou-kieou. Par Gustave Schlegel. "Extrait du T'oung-pao," vol. vi. No. 2. Leide: E. J. Brill, 1895. Size 10 × 7, pp. 52.

Ditto. XX. Niu-jin-kouo. Le Pays des Femmes (méridional). Par Gustave Schlegel. "Extrait du T'oung-pao," vol. vi. No. 3. Leide: E. J. Brill, 1895. Size 10 × 7, pp. 12.

China—Manchuria. *Scottish G. Mag.* **11** (1895): 217–231. **Ross.**

Manchuria. By the Rev. John Ross, D.D. *With Map.*

China—Mongolia. *M.G. Ges. Wien* **38** (1895): 85–118. **Leder.**

Eine Sommerreise in der nördlichen Mongolei im Jahre 1892. Von Hans Leder. II. Vom Orchon an den Tuin-gol.

China and Japan. *G.Z.* **1** (1895): 19–39. **Richthofen.**

Der Friede von Schimonoseki in seinen geographischen Beziehungen. Von F. von Richthofen.

India—Chitral. **Griffin.**

Chitral and Frontier Policy. By Sir Lepel Griffin. From the *Nineteenth Century*, June, 1895. Size 10 × 6½, pp. [10].

India—Railways. *J.S. Arts* **43** (1895): 569–587. **Parry.**

The coming Railways of India and their prospects. By J. W. Parry.

Japan—Bronze Casting. **Gowland.**

The Art of Casting Bronze in Japan. By W. Gowland. A Paper read before the Applied Art Section of the Society of Arts, April 23, 1895. Reprinted from the *Journal of the Society of Arts*, May 3, 1895. London: printed by W. Trounce, 1895. Size 11 × 7½, pp. 38. *Illustrations. Presented by the Author.*

Korea. *B. American G.S.* **27** (1895): 1–20. **Griffis.**

Korea and the Koreans: in the mirror of their language and history. A lecture by Wm. Elliott Griffis. *With Map.*

Mr. Griffis's statement that he has never been in Korea will surprise many readers; but his paper here given will confirm the opinion he expresses, that a knowledge of the language and literature of a country is in some cases more valuable than a superficial acquaintance with its scenery.

Korea. **Miln.**

Quaint Korea. By Louise Jordan Miln. London: Osgood, McIlvaine & Co., 1895. Size 8 × 5½, pp. viii. and 306. *Price 5s. Presented by the Publishers.*

A collection of newspaper articles and other lightly written essays on a visit to Korea.

Luchu Islands. **Chamberlain.**

The Luchu Islands and their Inhabitants. By Basil Hall Chamberlain. (From the *Geographical Journal* for April, May, June, 1895.) Size 10 × 6½, pp. 58. *Map and Illustrations.*

Malay Archipelago—Celebes. *Z. Ges. Erdk. Berlin* **30** (1895): 226–234. **Sarasin.**

Reiseberichte aus Celebes von Paul und Fritz Sarasin. II. Bericht. *With Map.*

Philippine Islands. *Globus* **67** (1895): 334–337. **Blumentritt.**

Ueber die Namen der malaiischen Stämme der philippinischen Inseln. Von Ferd. Blumentritt.

Philippine Islands. *M.G. Ges. Wien* **38** (1895): 228–248. **Blumentritt.**

Neuere Werke über die Philippinen. Von Ferd. Blumentritt.

Philippine Islands—Seismology. **Masó.**

Observatorio de Manila. La Seismologia en Filipinas. Datos para el Estudio de Terremotos del Archipielago Filipino reunidos y ordenados por el P. Miguel Saderra Masó. Manila, 1895. Size 12½ × 8½, pp. 122. *Maps and Plates. Presented by the Meteorological Observatory, Manila.*

Illustrated by numerous earthquake maps of the islands, and several seismograph tracings.

Palestine—Jerusalem. **Whitty.**

Discovery of "Whitty's Wall" at Jerusalem (King Solomon's Rampart). With Map. By Rev. John Irwine Whitty, LL.D., etc. London: Simpkin & Co., 1895. Size 9 × 5½, pp. 18. *Presented by the Author.*

Siberia—Tundra Rock-ice. **Toll.**

Wissenschaftliche Resultate der von der Kaiserlichen Akademie der Wissenschaften zur Erforschung des Janalandes und der Neusibirischen Inseln in den Jahren 1885 und 1886 ausgesandten Expedition. Abtheilung III. Die fossilen Eislager und ihre Beziehungen zu den Mammuthleichen.

Von Baron Eduard v. Toll. [Mémoires de l'Acad. Imp. des Sci. St. Pétersbourg, VII^e Série. Tome xlii. No. 13.] St. Petersburg, 1895. Size 13½ × 10, pp. viii. and 86. *Plates. Presented by the Author.*

A thorough study of the conditions of the ice in the tundras of the extreme north of Siberia, in five chapters. (1) Summary of previous knowledge regarding "rock-ice." (2) Rock-ice and its conditions in Janaland. (3) Rock-ice in the New Siberian Islands. (4) Fossil glaciers. (5) Conclusions relating chiefly to the problems arising from the preservation of mammoth-remains in rock-ice.

Western Asia—Ethnography. **Brinton.**

The Protohistoric Ethnography of Western Asia. By Daniel G. Brinton. Read before the American Philosophical Society, April 19, 1895. Philadelphia, 1895. Size 9 × 6, pp. 32. *Presented by the Author.*

AFRICA.

British East Africa. **McDermott.**

British East Africa, or *Ibea*. A History of the formation and work of the Imperial British East Africa Company. Compiled with the authority of the Directors from official documents and the records of the Company. By P. L. McDermott. New Edition. London: Chapman and Hall, 1895. Size 8½ × 5½, pp. xx. and 632. *Map, Portrait, and Illustration. Price* 6*s. Presented by G. S. Mackenzie, Esq.*

This edition carries on the history of the I.B.E.A. Company down to the date of the transfer of the Company's administration and property to the British Government, and so forms a complete history of an important episode in the development of Africa.

East and Central Africa. *Verh. Ges. Erdk. Berlin* **22** (1895): 270–295. **Neumann.**

Herr Oskar Neumann: Bericht über seine Reisen in Ost -und Central-Afrika. *With Map.*

Egypt. **Marriott.**

The Situation in Egypt. By Right Hon. Sir W. T. Marriott. From the *Fortnightly Review*, April, 1895. Size 10 × 6½, pp. [16].

Egypt—Ancient Masonry. **Schweinfurth.**

Ein altes Stauwerk aus der Pyramidenzeit. Von Georg Schweinfurth. [Illustrierte Deutsche Monatshefte.] [1895.] Size 10½ × 7, pp. 10. *Illustrations. Presented by the Author.*

Ethiopia. **Chaurand.**

Corpo di Stato Maggiore. Elenco generale Alfabetico dei nomi contenuti nella Carta dimostrativa dell' Etiopia compilata dal Maggiore E. de Chaurand. Roma: Stabilimento Civelli, 1895. Size 10½ × 7½, pp. 114.

Index to the new Italian map of Ethiopia.

French West Africa—Dahomey. *Abrégé B.S. Hongroise G.* **22** (1894): 66–78. **Tinayre.**

Onze mois au Dahomey (Mai 92—Mars 93). Par Abel Tinayre.

French West Africa—Porto Novo. *Rev. Scientifique* (4) **3** (1895): 593–598. **Marchoux.**

Porto-Novo et ses habitants. Par M. Marchoux.

French West Africa. *Rev. Scientifique* (4) **3** (1895): 459–465. **Monteil.**

Voyage au lac Tchad. Par M. P.-L. Monteil. *With Map.*

Madagascar. *Rev. G.* **36** (1895): 388–392. **Gaubert.**

Notre Carte de Madagascar. Par B. Gaubert. *With Map*

A clear, if somewhat rough, "war-map" of the island.

Sahara. *B.S.G. Paris* (7) **16** (1895): 10–74. **Foureau.**

Une mission chez les Touareg Azdjer. Par Fernand Foureau.

West Central Africa. *B.S.G. Paris* (7) **16** (1895): 5–9. **Maistre.**

Note sur la carte itinéraire de l'Oubangui à la Bénoué. Par C. Maistre. *With Map.*

West Africa—Borgu. **Lugard.**

England and France on the Niger: 'The Race for Borgu.' By Captain F. D. Lugard. From the *Nineteenth Century*, June, 1895. Size 10 × 6½, pp. [15].

West Africa—Nupé. *Rev. G.* **36** (1895): 328–337. **Béhagle.**

Le Noupé et les prétentions de la Compagnie royale du Niger. Par Ferdinand de Béhagle.

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Asia Minor. **v. Prittwitz u. Gaffron and v. Flottwell.**

Wege-Aufnahmen im Gebiet des unteren Qyzyl Yrmaq (Halys) Juli bis Dezember 1893. Aufgenommen und gezeichnet von v. Prittwitz u. Gaffron Premier-Lieutenant im Anhaltischen Inf. Regiment No. 93, kommandiert zur Kriegs-Akademie, und v. Flottwell. Premier-Lieutenant im Grenadier-Regiment Kronprinz Friedrich Wilhelm (2 Schlesisches) No. 11, kommandiert zur Kriegs-Akademie. Aus dem Originalmassstab von 1:100,000 reduziert auf 4 Blätter im Massstab 1:250,000 or 4 stat. miles to an inch. Petermann's 'Geogr. Mitteilungen,' Ergänzungsheft No. 114. Justus Perthes, Gotha, 1895. *Presented by the Publisher.*

AFRICA.

East Africa. **Kiepert and Moisel.**

Karte von Deutsch-Ostafrika. Scale 1:300,000 or 4·7 stat. miles to an inch. Construirt und gezeichnet von R. Kiepert und M. Moisel. 1 Mai

1895. Geographische Verlagshandlung Dietrich Reimer in Berlin, Hoefer & Vohsen.

This is another sheet of the map of German East Africa which is in course of publication. It contains the country between the southern end of Victoria Nyanza and Lat. 4° S., and from Long. 32° to 34° E. The principal routes of travellers, tribal boundaries, and numerous notes are given.

Transvaal. **Kitchin and Graydon.**

'The African Review' Map of the Witwatersrand District from Luipard's Vlei to Modderfontein. Compiled from official and other sources, by Joseph Kitchin and Newenham A. E. Graydon, F.R.G.S. (Editor). Scale 1 : 47,520 or 0·75 stat. mile to an inch. Published at the *African Review* Office, London. *Presented by Messrs. Will, Cannell, and Rider Haggard, Limited.*

This map will be useful to all persons interested in the Witwatersrand District. It shows the position and extent of mining claims, the position of the main reef, and the number of claims held by each company or individual.

Victoria Nyanza. **Brard.**

Originalkarte einer Forschungsreise auf der Sesse Insel. Aufgenommen u. gezeichnet von Pater Brard, 1893. Petermann's 'Geogr. Mitteiln.,' Jahrgang 1895, Tafel 11. Gotha: Justus Perthes. *Presented by the Publisher.*

AMERICA.

Mexico and British Honduras. **Sapper.**

Karte der Verbreitung der Sprachen in Südost-Mexico und Britisch Honduras ums Jahr 1894. Von Dr. Karl Sapper. Scale 1 : 4,000,000 or 63·1 stat. miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1895, Tafel 12. Justus Perthes, Gotha. *Presented by the Publishers.*

AUSTRALASIA.

New Guinea. **Brixen and Linnemann.**

Das Hinterland von Hatzfeldthafen (Kaiser Wilheim Land). Auf Grund der Aufnahmen und Vermessungen der Landmesser von Brixen und Linnemann entworfen u. gezeichnet v. P. L. Scale 1: 100,000 or 1·6 stat. mile to an inch. Langhans: Beiträge zur Kenntnis der Deutschen Schutzgebiete Bl. 9. Petermann's 'Geogr. Mitteilungen,' Jahrgang 1895, Taf. 13. Justus Perthes, Gotha. *Presented by the Publisher.*

Ancient Geography. **Sieglin.**

v. Spruner-Sieglin, Hand-Atlas zur Geschichte des Altertums, des Mittelalters und der Neuzeit. I. Abteilung: Atlas Antiquus. Atlas zur Geschichte des Altertums. 34 kolorierte Karten in Kupferstich, enthaltend 19 übersichtsblätter, 94 historische Karten und 73 Nebenkarten. Entworfen und bearbeitet von Dr. Wilhelm Sieglin. Vierte Lieferung. Gotha: Justus Perthes, 1895. *Price 2 marks 5 pf. each part.*

The present issue of this atlas contains—No. 6, Asia Superior; No. 22, Italiæ pars Meridionalis; No. 23, Roma urbs; No. 26, Imperium Romanum inde a bello Hannibalico usque ad imperatoris Augusti mortem. Numerous insets are given, and the maps are beautiful specimens of cartography.

GENERAL.

Meteorological. **Schott.**

Linien gleicher mittlerer Jahresschwankung der Temperatur des Oberflächenwassers der Oceane. Entworfen von Dr. Gerhard Schott, 1895. Petermann's 'Geographische Mitteilungen,' Jahrgang 1895, Taf. 10. Gotha: Justus Perthes. *Presented by the Publisher.*

School Atlas. **Ravenstein.**

Philips' Systematic Atlas. Physical and Political. Specially designed for the use of higher schools and private students. Containing 170 maps and diagrams in 41 plates, and a complete Index of over 12,000 names. By E. G. Ravenstein, F.R.G.S. G. Philip & Son, London, 1895. *Price 10s. 6d. Presented by the Publishers.*

The World. **Ravenstein.**

Philips' Handy Volume Atlas of the World. An entirely new and enlarged edition, containing seventy-two new and specially engraved plates, with statistical notes and complete index. By E. G. Ravenstein, F.R.G.S. George Philip & Son, London, 1895. *Price 5s. Presented by the Publishers.*

The World. **The "Times."**

The Times Atlas. Published at the *Times* Office, London. Parts 14 and 15. Complete in fifteen weekly parts. *Price 1s. each part. Presented by the Publishers.*

Part 14 contains the following maps: Southern France, a general map of Germany, Austria-Hungary, Central Asia, and India. Part 15 contains a map of the World on Mercator's projection, and three insets showing the British possessions and the commercial routes of the World, West Africa, Polynesia, Victoria, and New South Wales. With the issue of Part 15 this atlas is complete. Each part has been furnished with an index for all the maps it contains, and in addition to the principal maps, there are numerous insets. Taken as a whole, it is a useful atlas for general reference, and the cheapest, of its class, that has ever been published in this country.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, May and June, 1895. *Presented by the Hydrographic Department, Admiralty.*

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562	m = 13·87	Spain, east coast:—Port of Valencia. 2*s.* 6*d.*
1304	m = various.	Plans on the coast of Chile:—Tictoc bay, Port San Pedro, Sheep cove, Small cove, Comau or Leteu inlet, Moche island, Buchupureo road. 1*s.* 6*d.*
935	m = 1·32 m = 4·75	Africa, west coast:—Isles do Los (Idolos), Konakri road. 1*s.* 6*d.*
759A	m = 0·09	Madagascar, west coast:—Cape St. Andrew to Bevato island. 2*s.*
759B	m = 0·09	Madagascar, east coast:—Antongil bay to Ambatosoa. 2*s.*
567	m = 3·9	Australia, south-east coast:—Jervis bay. 3*s.*
1160		Barnstaple and Bideford:—Plan added: Ilfracombe.
2360		Cape Falsterbö to Kalmar sound:—New plan: Rönne harbour.
2743		Rade de la Hougue:—Plan added: Port Barfleur.
1813		Port Paita to Ayangui point:—Plan added: Zorritos.
1915		Anchorages in Alaska:—Plan added: Lazy bay.
1227		Cape Spartel to Azimur:—New plans: El Araisti Rabat and Sali.
935		Harbours and anchorages between Bali and Timor:—New plan: Bima bay. Plans added: Coaling station anchorage, Waingapu road, Koepang road.
1236		Approaches to Port Arthur:—New plan: Port Arthur.
1316		Cape Duroch to Linden point:—Plan added: Vitiaz bay.
991		Anchorages on the coasts of Yezo island:—Plan added: Bokkiriso bay.
1473		Rossel island and lagoon:—Plan added: Pwenegwa harbour.
2169		Islands in the North Pacific:—Plans added: Necker island, Nihoa or Modu Manu (Bird island).

Charts Cancelled.

No.		Cancelled by	No.
1158	Ilfracombe harbour.	New Plan. Ilfracombe on sheet	1160
881	Approaches to Haugesund.	New Chart. Urter to Hisken, etc.	881
562	Port of Valencia.	New Chart. Port of Valencia	562
1304	Port San Pedro, Sheep, and Small coves.	New Chart. Plans on the coast of Chile	130
565	Tictoc bay.		
566	Comau or Leteu.		
1305	Mocha island.		
759	Cape St. Andrew to Bevato island.	New Charts. Cape St. Andrew to Bevato Island	759A
	Antongil bay to Ambatosoa.	Antongil bay to Ambatosoa	759B
2176	Plan of Jervis bay on this sheet.	New Chart. Jervis bay sheet	567
1160	Plan of Barnstaple bar on this sheet.		
2456	Muskeget channel.		
935	Plans of Labuan Tering bay and Nangamesi bay on this sheet.		

Charts that have received Important Corrections.

No. 117, North Atlantic Ocean:—Færoe islands. 1772, Ireland, south coast:—Approaches to Wexford harbour. 2309, Norway, west coast:—Leka to Donnæs. 2333, Lapland:—Varanger fiord to Mal Oleni. 2623, Maltese islands:—Comino channels. 1659, Mediterranean:—Lemnos islands. 2890, North America, east coast:—Nantucket shoals to Block island. 2544, South America, east coast:—Rio de la Plata. 1749, South America, east coast:—Monte Video to Buenos Aires. 758, Madagascar, northern portion. 2762, Indian Ocean:—Comoro islands. 942A and 942B, Eastern Archipelago, eastern portion. 934, Eastern Archipelago:—Surabaya, Bali and Sapudi straits. 2657, Japan:—Gulf of Tokyo or Yedo. 2432, Russian Tartary:—Tumen Ula to Stielok bay. 2122, New Guinea:—Round head to Orangerie bay. 2123, New Guinea:—Orangerie bay to Bramble haven. 2423, New Guinea:—Boigu island to Cape Blackwood. 960, Tasmania:—Approaches to Hobart. 1510, Pacific Ocean:—Sandwich islands.

(*J. D. Potter, Agent.*)

United States Charts. **U.S. Hydrographic Office.**

Pilot Charts of the North Pacific Ocean for July and August, and North Atlantic Ocean for July, 1895. Published monthly at the Hydrographic Office, Bureau of Navigation, Department of the Navy, Washington, D.C. Charles D. Sigsbee, Commander U.S.N., Hydrographer. *Presented by the U.S. Hydrographic Office.*

PHOTOGRAPHS.

East Africa. **Benett-Stanford.**

Album containing 19 Photographs of East Africa, taken by J. Benett-Stanford, Esq., in the neighbourhood of Lamu, Tana River, etc. *Presented by J. Benett-Stanford, Esq.*

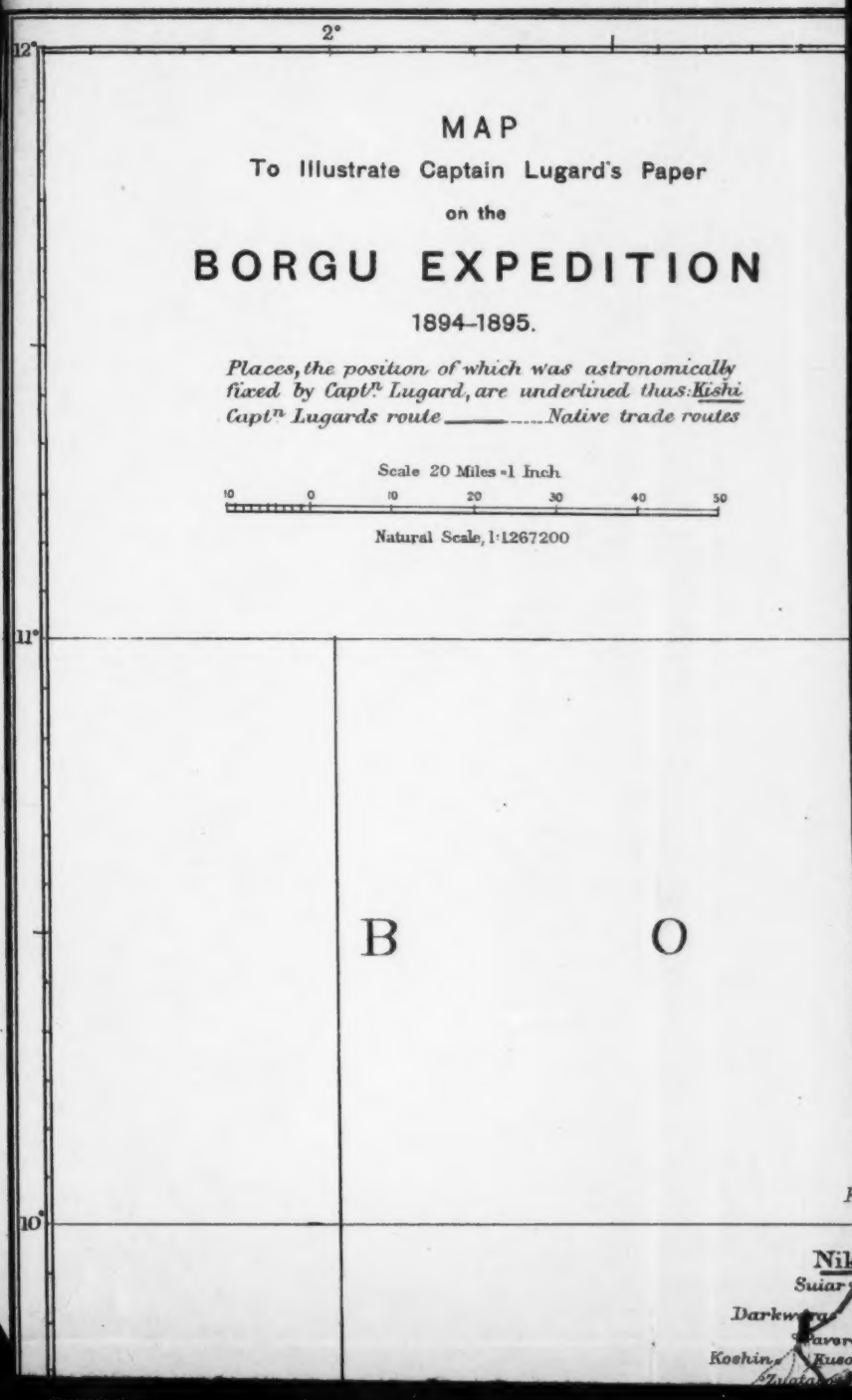
This album contains a very fine set of photographs of camp scenes and natives, taken by Mr. J. Benett-Stanford during his travels in East Africa.

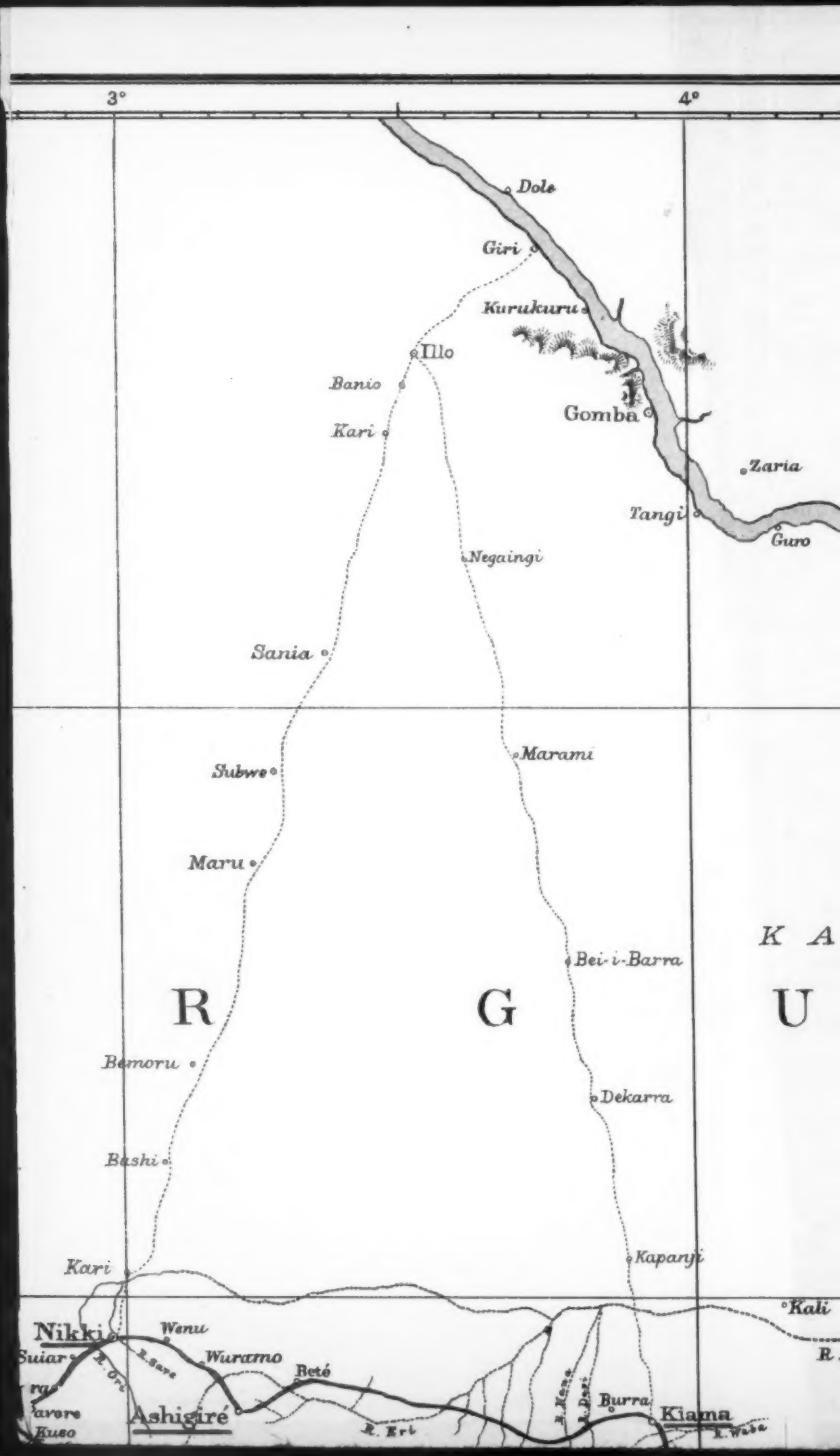
U.S. of Colombia. **Gledhill.**

69 Photographs of the U.S. of Colombia, taken by Edward Gledhill, Esq. *Presented by Edward Gledhill, Esq.*

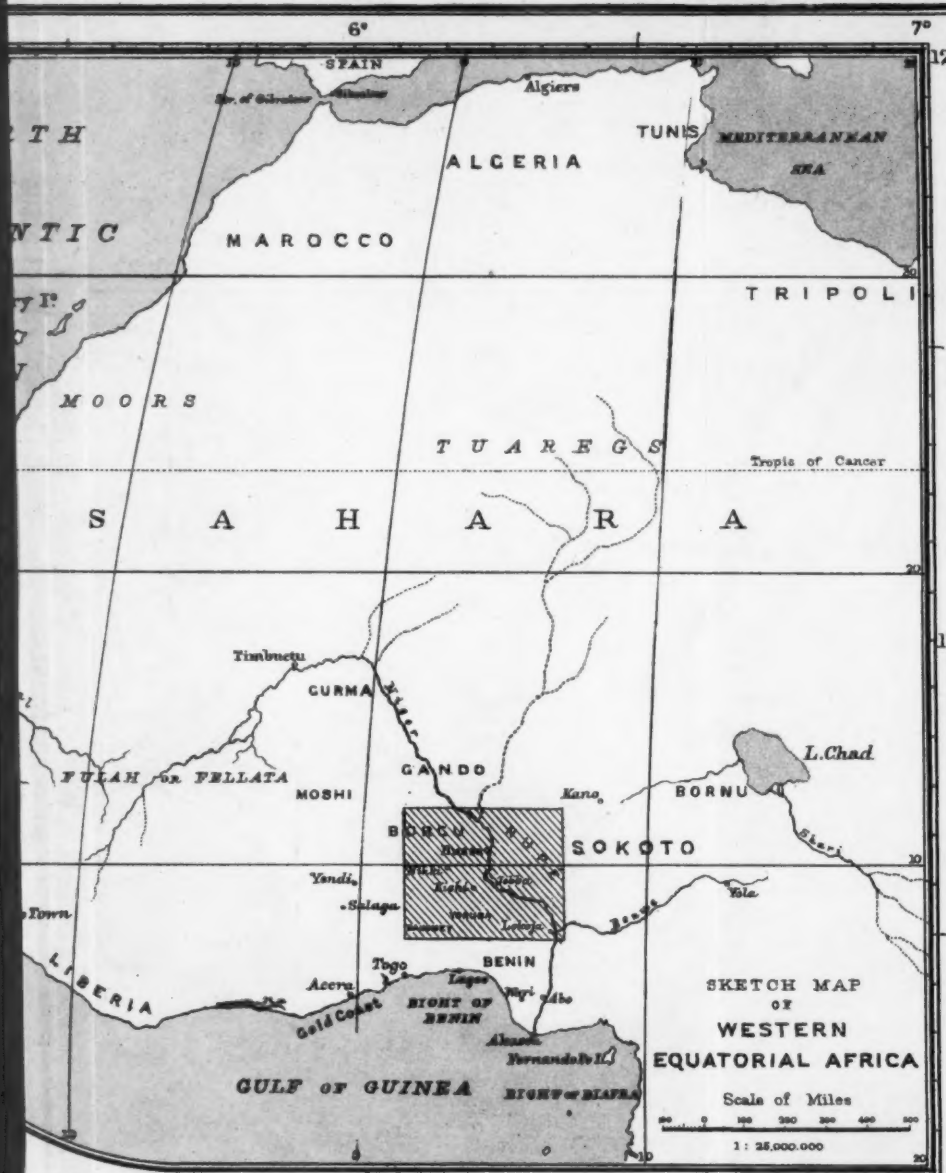
This series contains a number of photographs that have been well chosen to illustrate the scenery of Colombia, and the everyday life of the people. As we have very few views of this portion of South America, Mr. Gledhill's donation is a valuable addition to the Society's collection.

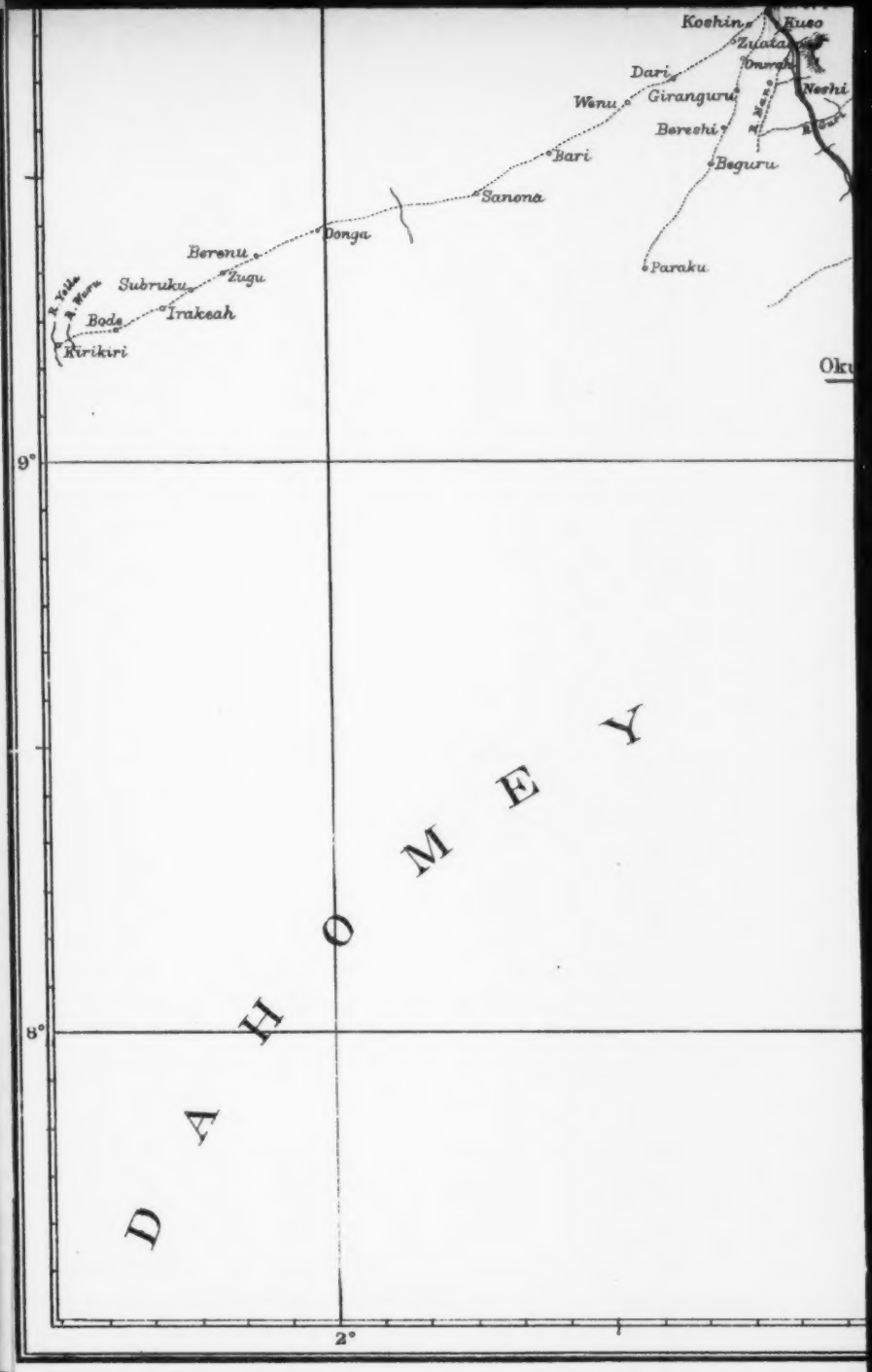
N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

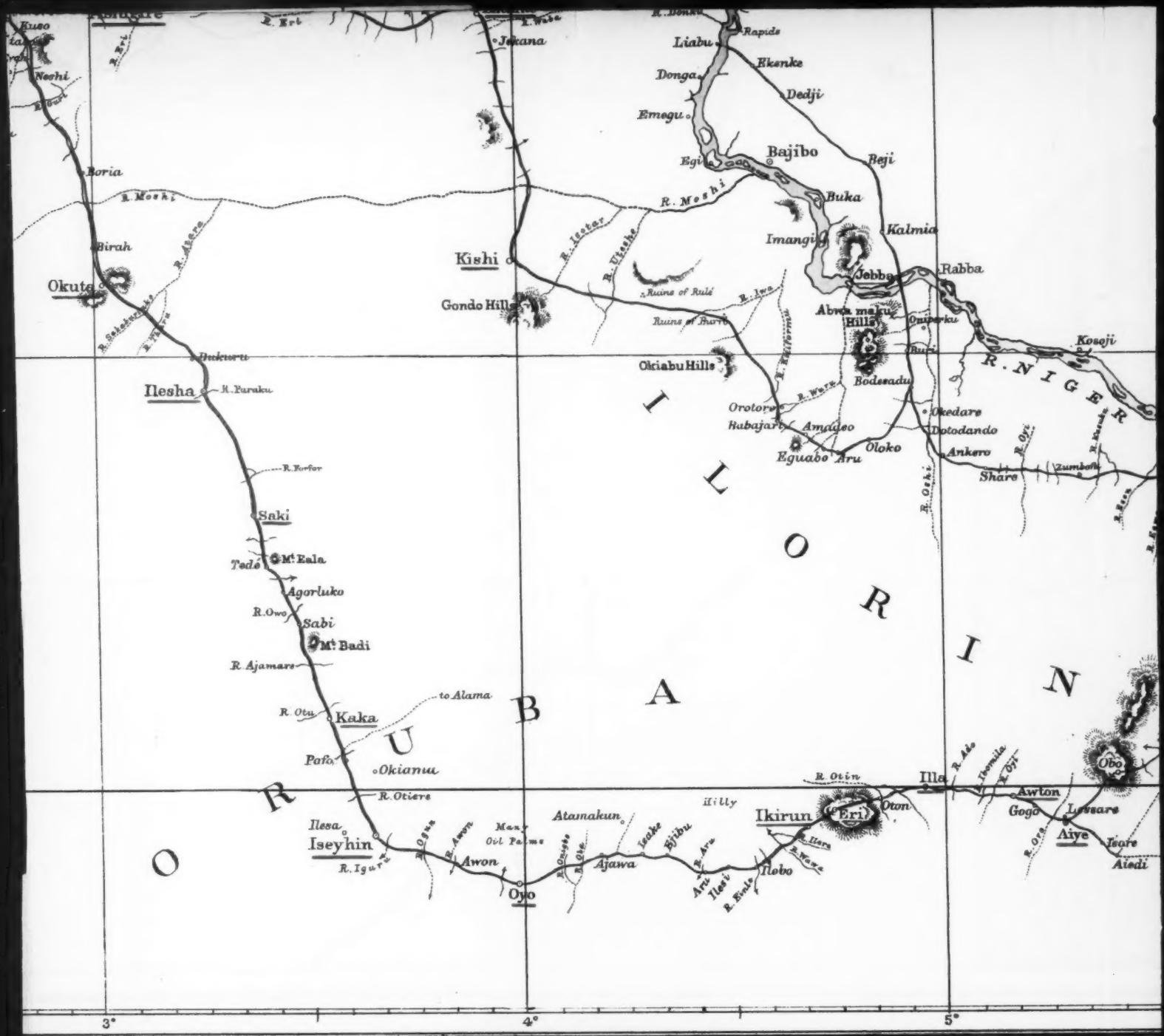

2°
12°
11°
10°
MAP
To Illustrate Captain Lugard's Paper
on the
BORGU EXPEDITION
1894–1895.
Places, the position of which was astronomically fixed by Captn Lugard, are underlined thus: Kishi
Captn Lugards route ——— .....Native trade routes
Scale 20 Miles =1 Inch
10 0 10 20 30 40 50
Natural Scale, 1:1267200
B O
Nik
Koshin
Kuso


3°
4°
Dole
Giri
Kurukuru
Illo
Banio
Kari
Gomba
Zaria
Tangi
Guro
Negaingi
Sania
Marami
Subwe
Maru
Bei-i-Barra
K A
R
G
U
Bemoru
Dekarra
Bashi
Kapanji
Kari
Kali
Nikki
Wenu
Suiar
Wuramo
Beté
Ashigiré
Burra
Kiama
R. Erl

5°
NORTH
ATLANTIC
OCEAN
Canary Is.
MOO
S
C. Blanco
Senegal
C. Verde
FULAH
Sierra Leone
Free Town
LIBERIA
Dugu
Ruga Elani
Fanfandegi
Tandi
Babu
Ikung
Zamare
Shilu
Koma
Eoge
AMBARI
Wara
Kagogi
Bussa
R. Dora
Melarli
Garafili
Kangi
Kali
Potashi
R. Lori (Ori)
Fakun
R. Donku
N


6°
7°
12°
11°
10°
SPAIN
Str. of Gibraltar
Gibraltar
Algiers
TUNIS
MEDITERRANEAN SEA
ALGERIA
MAROCCO
TRIPOLI
MOORS
TUAREGS
Tropic of Cancer
S A H A R A
Timbuctu
GURMA
Niger
GANDO
FULAH or FELLATA
MOSHI
Kano
BORNU
L. Chad
BORGU
Burrum
NUPE
Kiabie
Gaiama
SOKOTO
Sokoto
Yendi
Salaga
Kebbi
Yauri
Zaria
Bida
Yola
Benue
Town
LIBERIA
Togo
BENIN
Accra
Lagos
Wari
Abo
Gold Coast
BIGHT OF BENIN
Aleanche
Fernando Po I.
GULF OF GUINEA
BIGHT or BIAFRA
SKETCH MAP
OF
WESTERN
EQUATORIAL AFRICA
Scale of Miles
1 : 25,000,000


Koshin
Kuso
Zuata
Dari
Wenu
Giranguru
Neshi
Bereshi
Bari
Beguru
Sanona
Donga
Berenu
Zugu
Subruku
Irakeah
Bode
Ririkiri
Paraku
9°
8°
2°
DAHOMEY



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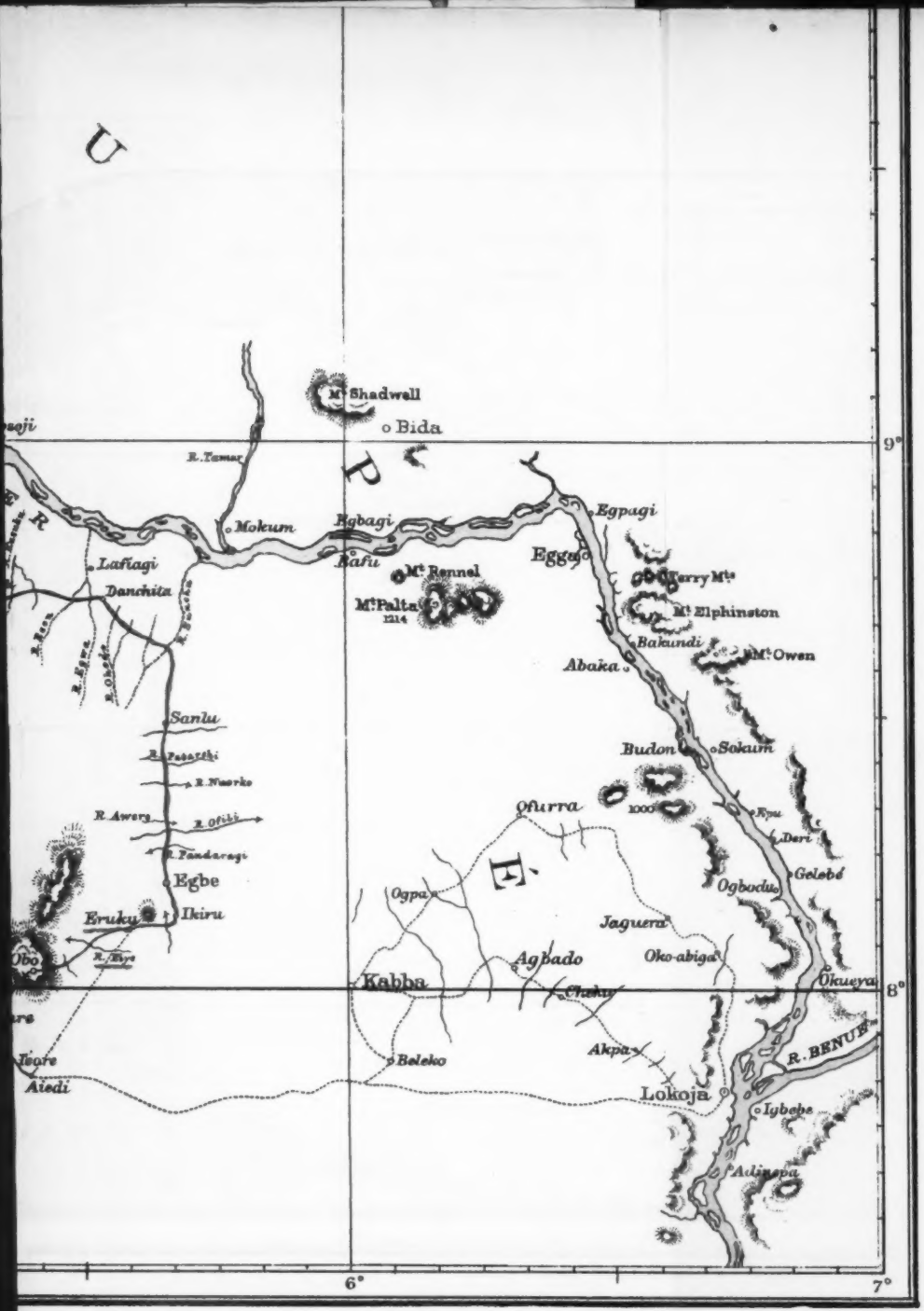
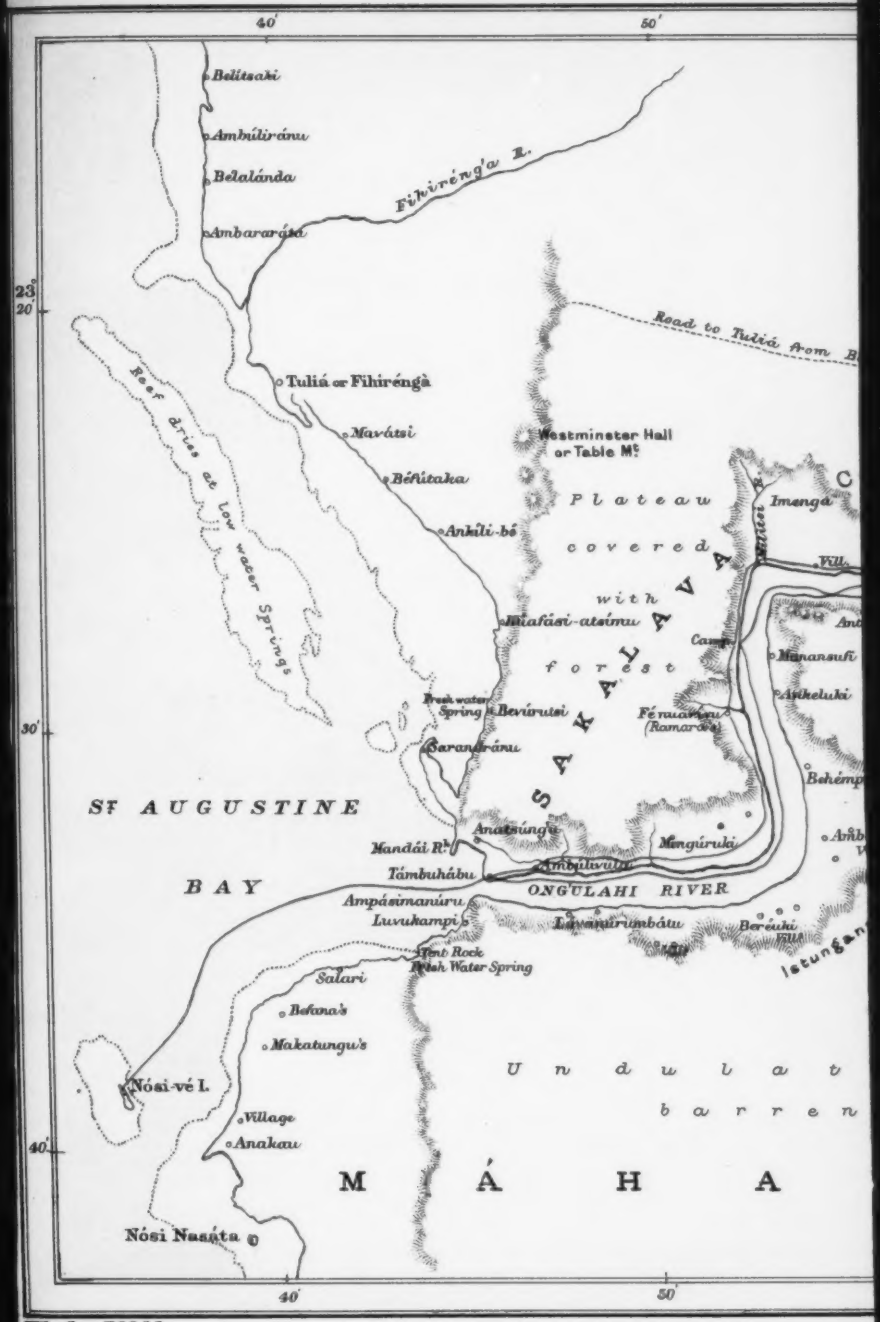
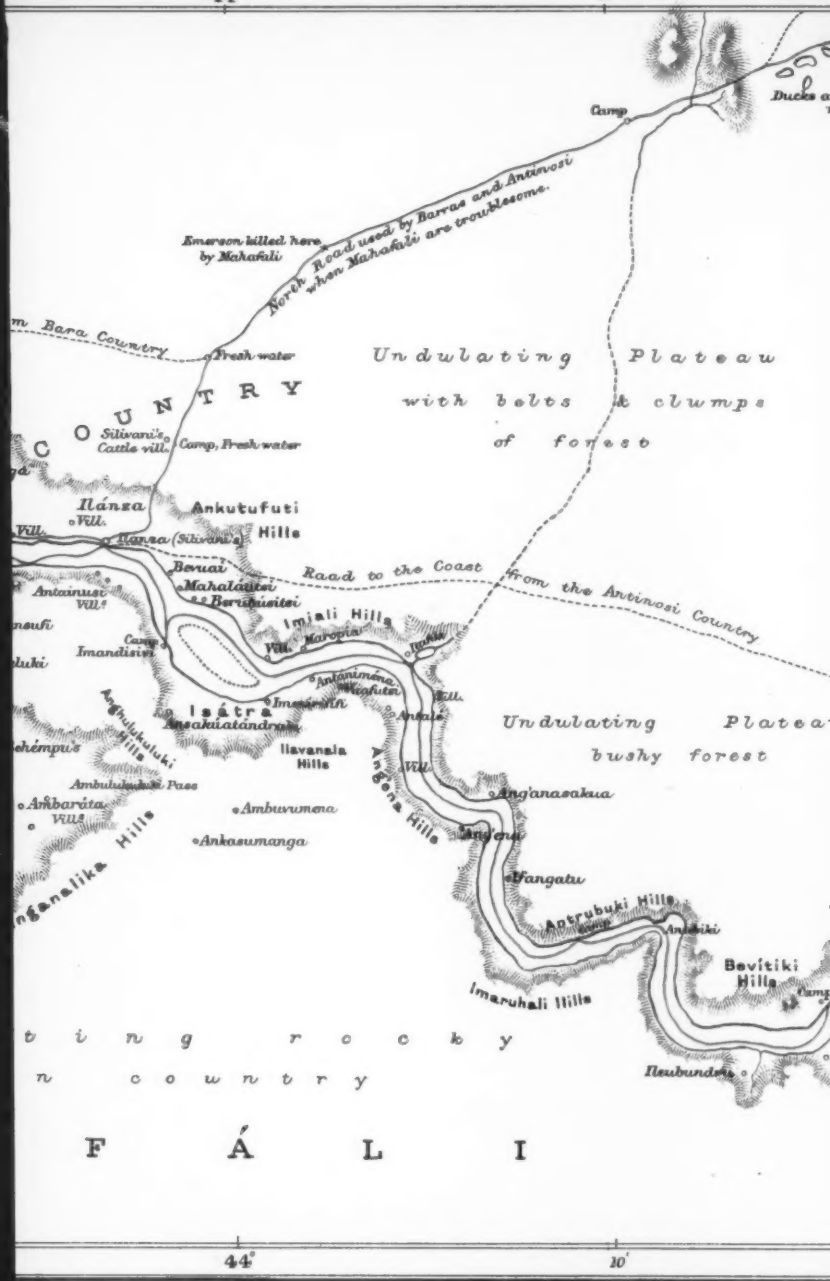

Mt Shadwell
Bida
R. Tamar
Mokum
Agbagi
Kafu
Egpagi
Egga
Mt Rennel
Mt Palta
1214
Terry Mts
Mt Elphinston
Bakundi
Mt Owen
Abaka
Lafiagi
Danchita
Sanlu
R. Awery
R. Ofiki
Egbe
Eruku
Ikiru
Obo
R. Ekpe
Ofurra
1000
Budon
Sokum
Ogpa
Jaguera
Oko-abiga
Agbado
Kabba
Okuoya
Akpa
R. BENUE
Lokoja
Iybebe
Adinepa
Beleko
Iwore
Aiedi
9°
8°
6°
7°



H.Harbau R.G.S. del.


44°
10'
Camp
Ducks
Emerson killed here by Mahafali
North Road used by Barras and Antivosi when Mahafali are troublesome.
m Bara Country
Fresh water
Undulating Plateau
with belts & clumps
of forest
COUNTRY
Silivani's Cattle vill.
Camp, Fresh water
Ilánza
Vill.
Ankutufuti Hills
Vill.
Ilanza (Silivani's)
Beriai
Maharáiti
Beriáisiti
Road to the Coast from the Antivosi Country
Antainusi Vill.?
Imjali Hills
Camp
Imandisiri
Vill.
Maropia
Antanimena
Mahafuta
Vill.
Imasinin
Antala
Isátra
Ansakuiatándrano
Undulating Plateau
bushy forest
Ambulululuki Hills
Ilavanala Hills
Vill.
Ambulululuki Pass
Ambarata
Vills
Ambuvumona
Ankasumanga
Angona Hills
Ang'anasakua
Ang'eru
Vangatu
Antrubuki Hills
Camp
Antsiki
Bevitiki Hills
Camp
Imaruhali Hills
ting rocky
n country
Ilaubundra
FÁLI
44°
10'

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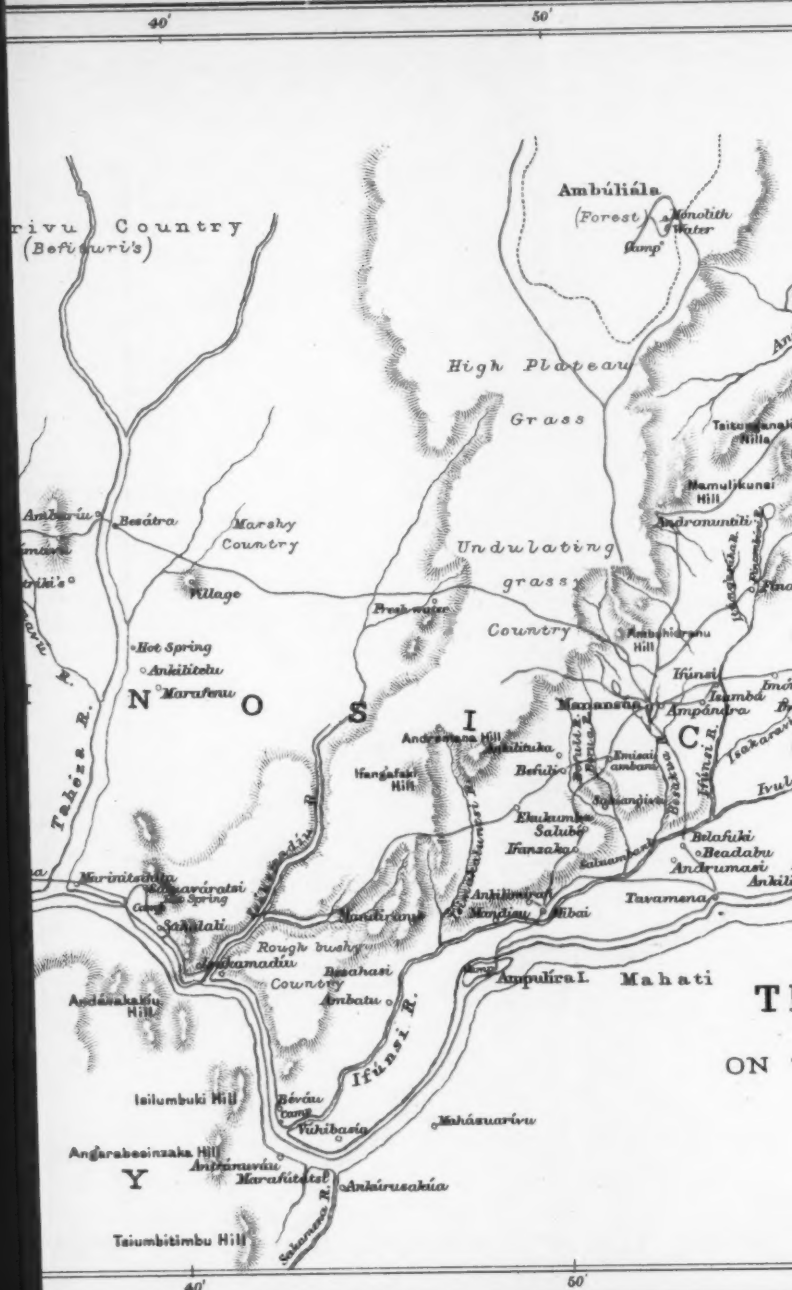
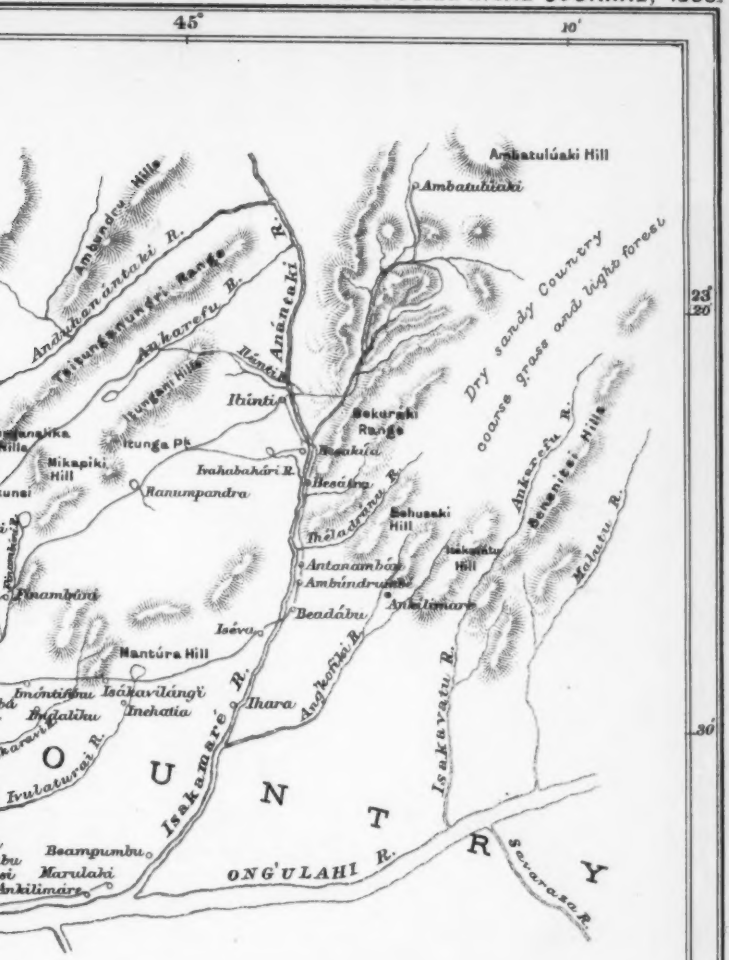

40'
50'
Country
(Befiuriu's)
Ambúliála
(Forest)
Monolith
Water
Camp
High Plateau
Grass
Undulating
grass
Country
Marshy
Country
Village
Besátra
Hot Spring
Ankiitetu
Marafenu
Fresh-water
Mamulikunai
Hill
Andranuntili
Mahabidranu
Hill
Ihúnsi
Isambá
Ampándra
Manansóa
Andrasena Hill
Ankalituka
Befúdio
Emisai
ambara
Ifangafasi
Hill
Elaukumba
Salubé
Franzaka
Belafuki
Beadabu
Andrumasi
Tavamena
Ankilimiraf
Mandiau
Mibai
Mandiranga
Rough bushy
Country
Bezahasi
Ambatu
Ampulira I.
Mahati
Andáwakafu
Hill
Ifúnsi R.
Isilumbuki Hill
Béráu
camp
Vuhibasia
Mahásuarívu
Angarabesinzaka Hill
Aritránuráu
Marahítsisi
Ankúrusakúa
Taiumbitimbu Hill
Tabéza R.
Isakaranu R.
Ivul
Maritsitsika
Ambavarátsi
Hot Spring
Camp
Sáhalali
Andamadiu
Salumanga R.
Y
N O S I C
ON



THE ONG'ULAHI RIVER

AND ADJACENT COUNTRY

ON THE WEST COAST OF MADAGASCAR

showing the explorations of

J. T. Last.

Reduced from the Original Drawing

Routes in Red.

Scale of Miles.

0 5 10 15

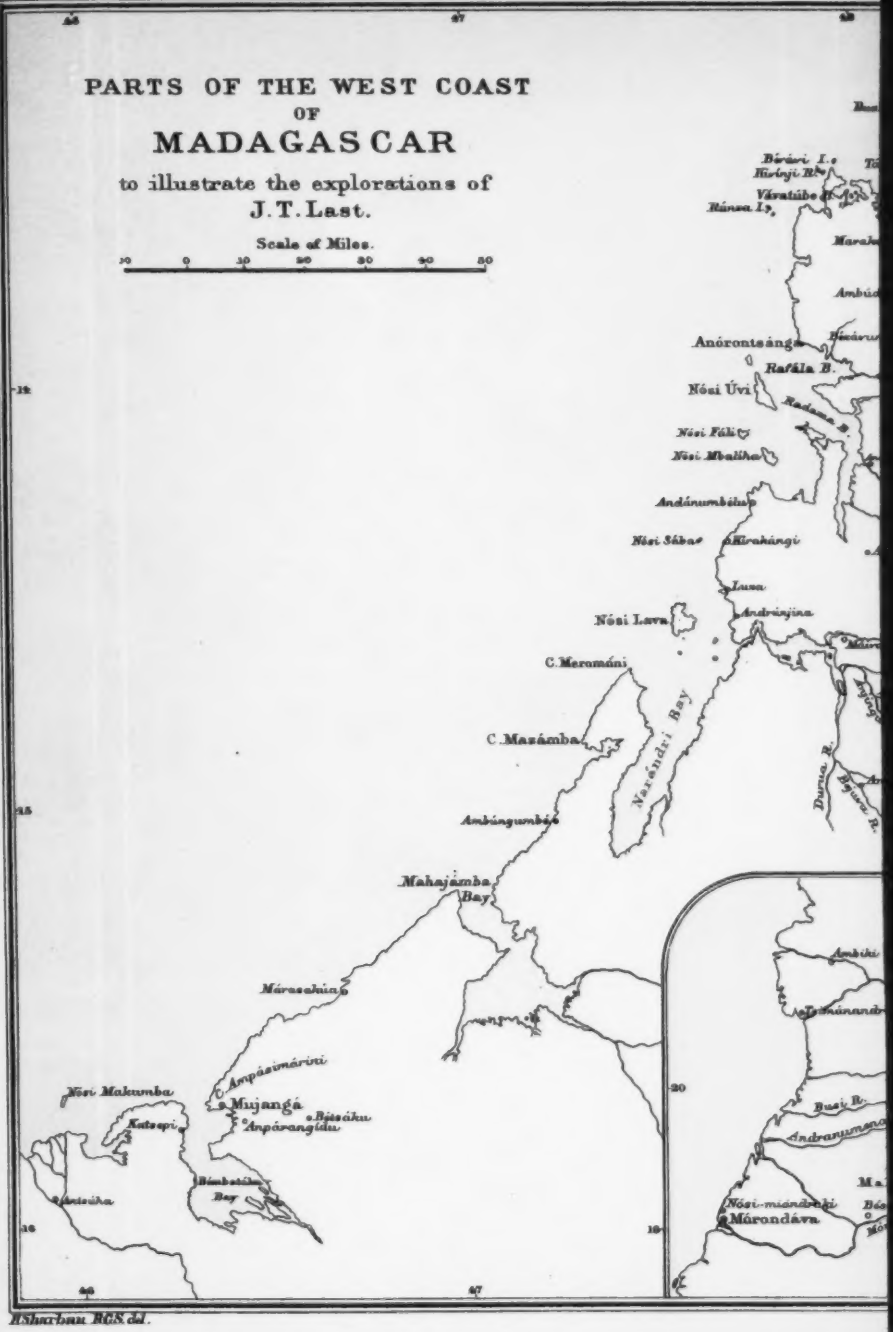
1 inch = 4.6 miles. Natural Scale 1: 291,450.

F. S. Weller.

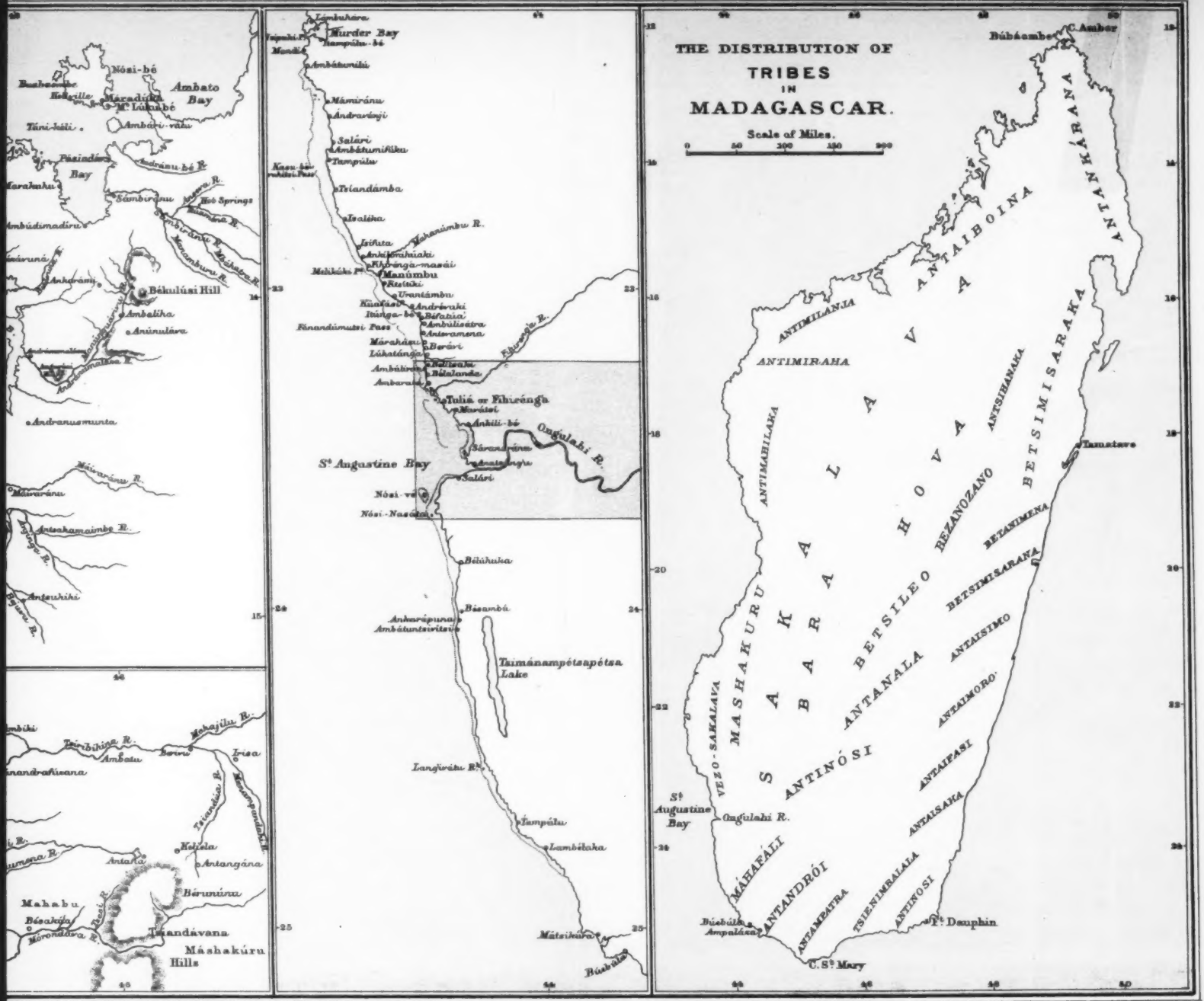
PARTS OF THE WEST COAST
OF
MADAGASCAR

to illustrate the explorations of
J. T. Last.

Scale of Miles.



H. Sharman. RGS. del.



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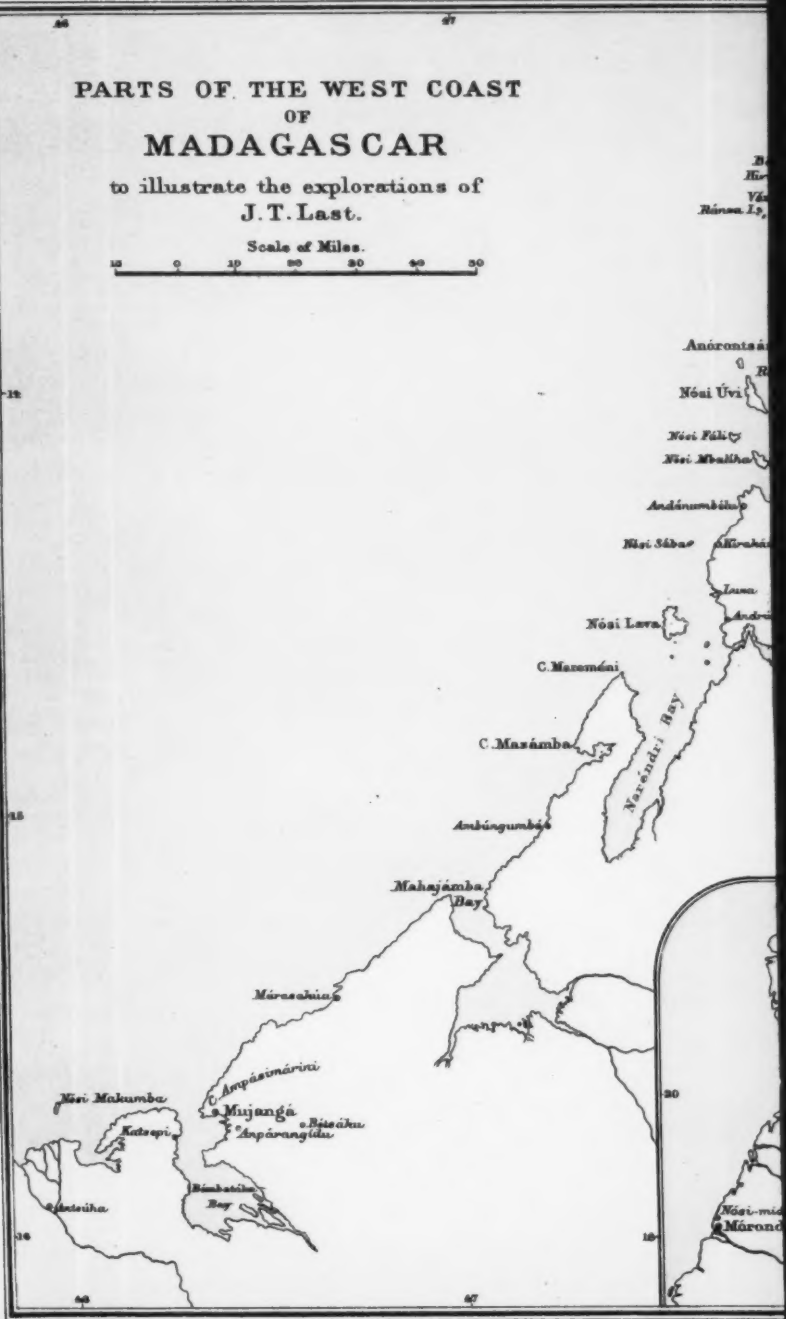
F.S.Waller, lith.

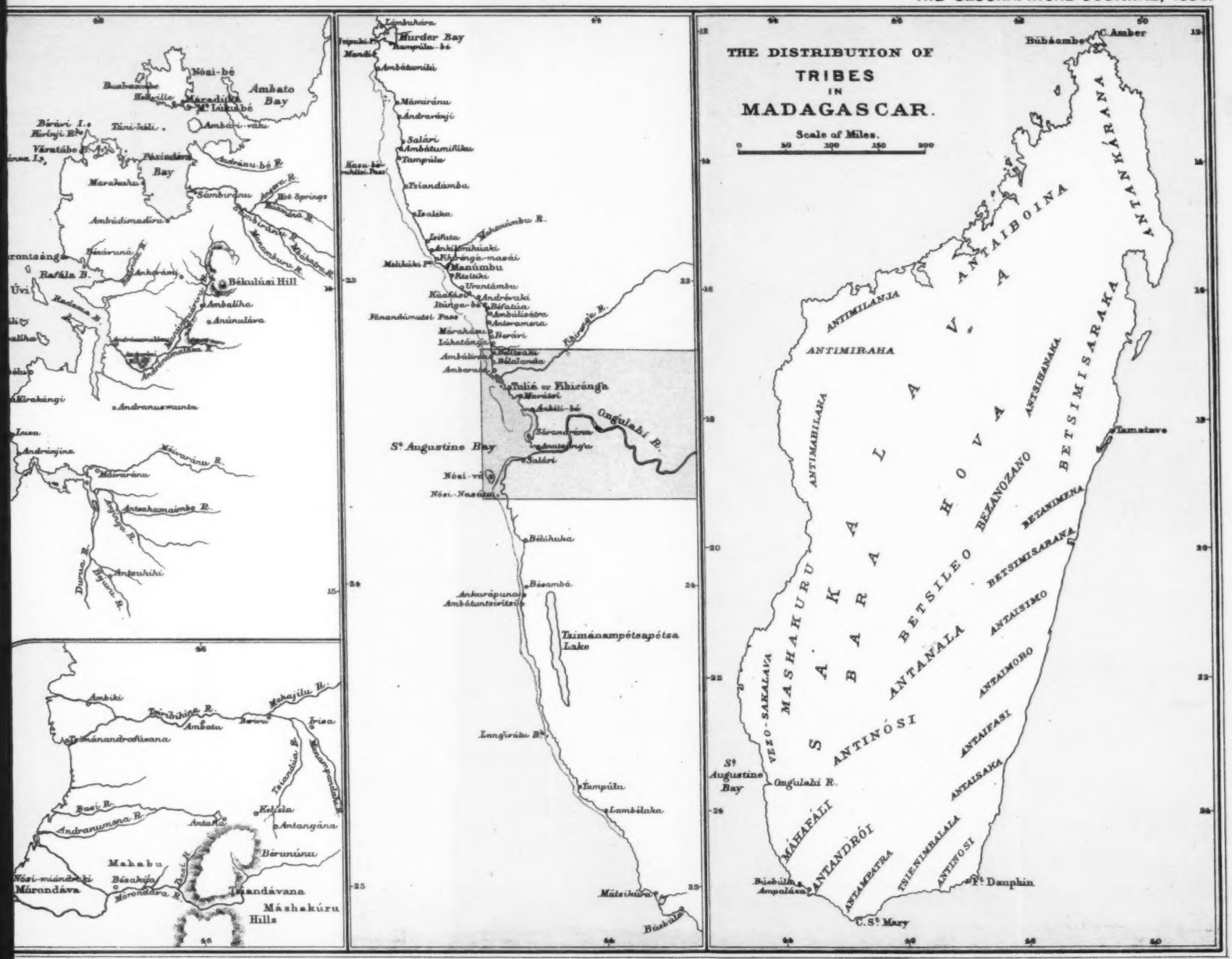
PARTS OF THE WEST COAST OF MADAGASCAR

to illustrate the explorations of J. T. Last.

Scale of Miles.



H. Sharbau. R.G.S. del.



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F.S.Weller, lith.